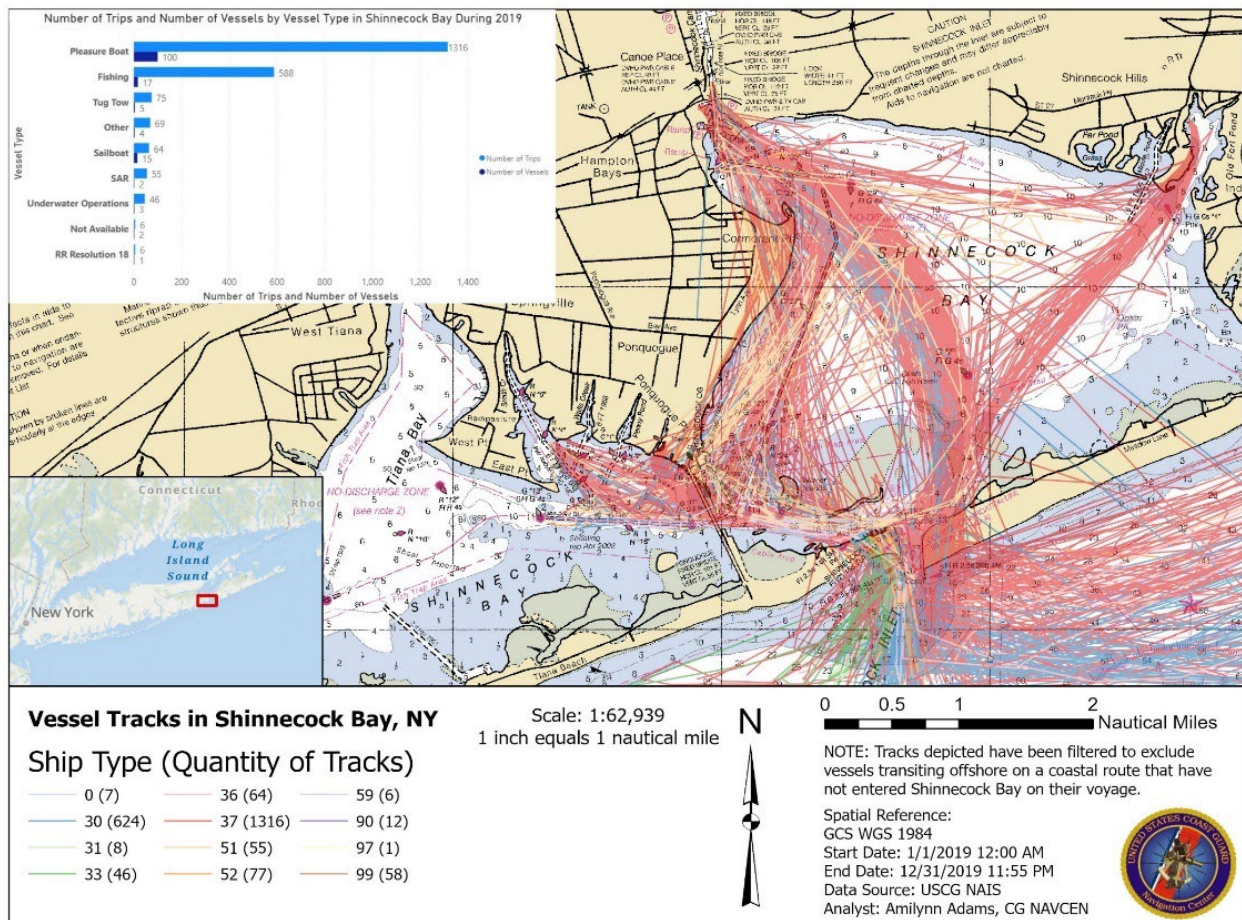


Shallow Water Level of Service Study

United States Coast Guard
 Marine Transportation System Directorate (CG-5PW)
 Office of Navigation Systems (CG-NAV)



Prepared By: CG-NAV-3, Navigation Technology & Risk Management Division

NOVEMBER 7, 2023

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Executive Summary

Why this study?

The [Director, Marine Transportation Systems \(CG-5PW\) initiated action](#) to modernize physical aids to navigation (ATON). Our waterway users have changed significantly over the past three decades with increased traffic, larger vessels, and expanded petroleum-based shipping; however, our waterway dimensions and infrastructure have not kept pace. The Coast Guard is dedicated to leveraging technology to bring our maritime transportation system into the 21st Century by defining and refining our ATON level of service to enhance mariner situational awareness, sustain mariner safety, while improving the efficiency of our physical ATON constellation.

This is the fourth in a series of five studies addressing ATON levels of service in the navigable waters of the United States. This study covers navigable waters less than twelve feet in depth. Completed studies include Western Rivers, Atlantic and Gulf Coastal, and Pacific Coastal. A Deep-Water Study pends.

What SWLOSS found.

More than 40-percent of aids listed in the Aids to Navigation Information System (ATONIS) [35,114] database are in waters less than 12-feet [14,611] and reviewed as part of this study.

The study first filtered for Aid Availability Category III aids [12,457].

The study—

- Further filtered by waterway criticality group, DRF1 score, and datum.
- Found 5,215 aids in non-critical waterways and recommended 2,480 be considered for discontinuation or relocation based on low DRF1 score [less than fifteen].
 - Recommended a subset with datum less than six feet, potentially serviceability problematic, for priority consideration [1421]. [\[Link to .xlsx\]](#), [\[Link to GIS\]](#).
 - All to be considered at Phase I workshops.
- Found 7,242 aids in critical waterways and recommended 2,388 be considered for discontinuation or relocation based on low DRF1 score [less than fifteen].
 - Recommended a subset with datum less than six feet, potentially serviceability problematic, for priority consideration [1738].
 - All to be considered at Phase II workshops. Phase II discontinuations may be deferred until completion of quantitative risk assessment projects. Phase II discontinuations will require further NAV authorization.

The study encountered some data issues requiring correction—

- There were 4,693 Waterway Type blanks within the 35,000+ aid in IATONIS, and
- 1,055 Waterway Criticality Group blanks among the 14,611 in scope Shallow Waterway Maintained (SWM) and Shallow Water Not Maintained (SWNM) Waterway Type aids.

What SWLOSS Recommends.

The study recommends—

- Establishing a measured approach to reducing the ATON constellation incrementally over time.
- Accepting the NNAVSAC definition of modern prudent mariner in the context of CFR language defining the ATON mission.
- Approving proposed Shallow Water track keeping design standards.
- Coordinating workshops to support District/Sector Waterway Managers in the change consideration process.
- Issuing policy guidance for circumstances warranting waterway withdrawal.

Purpose

This study is intended to update current Coast Guard Short Range Aids to Navigation [SRA] design frameworks to account for:

- Evolution in waterway user profiles [type, size, density].
- Accessibility of technology such as GPS and Electronic Charts that enable highly accurate, real-time georeferencing.
- Application and use of AIS-ATON signals.
- Resilience to GPS disruptions or other failure to technology-based navigation for vessels.

The Coast Guard has a duty to design cost effective and efficient SRA systems based on mature navigation technologies and to encourage the use of promising emerging technologies. SRA design accounts for waterway risk during normal operating conditions with access to navigation technology, and during contingency conditions, where navigation technology may be inaccessible or disrupted. Risk and cost profile are assessed at each individual waterway. Additional study objectives included:

- Implications of a design consideration of six feet as a “least serviceable depth”.
- Waterway withdrawal policy based on marginal marking circumstances, to include:
 - Waterways not federally charted.
 - Severe shoaling without dredging prospect (e.g., Virginia Inside Passage).
 - Dynamic shoaling without appropriate survey support (e.g., inlets/passes).

A targeted look at Apalachicola-Chattahoochee-Flint (ACF) River system was also included in this study as a holdover from the Western Rivers Level of Service Study, [631 aids: 451 floating, 180 fixed] due to unresolved USACE lock and dam repair and dredging spoils disposal issues impacting the waterway’s navigability.

Strategic Alignment and Guiding Principles.

[Title 33 CFR, parts 60 through 76](#) provide the regulatory guidance for the authorities granted in U.S. Code Section 62.1(c) defining the scope of USCG responsibilities for ATON.

The Coast Guard maintains systems of marine aids to navigation consisting of visual, audible, and electronic signals which are designed to assist the prudent mariner in the process of navigation. The aids to navigation system is not intended to identify every shoal or obstruction to navigation which exists in the navigable waters of the United States, but rather provides for reasonable marking of marine features as resources permit. The primary objective of the aids to navigation system is to mark navigable channels and waterways, obstructions adjacent to these waterways, and obstructions in areas of general navigation which may not be anticipated. Other waters, even if navigable, are generally not marked.

The [ATON Administration Manual](#) defines the mission and objectives.

The United States Aids to Navigation System [USATONS] is established, maintained, and operated to mitigate Marine Transportation System [MTS] transit risks by reducing the potential for collisions, allisions, and groundings. Reducing transit risks will in turn contribute to protecting national interests by ensuring the safe and efficient flow of commercial vessel traffic through the MTS.

The specific objectives of the USATONS are to:

- *Assist the navigator in determining their position.*
- *Assist the navigator in determining a safe course.*
- *Warn the navigator of dangers and obstructions.*
- *Promote the safe and economic movement of commercial vessel traffic.*
- *Promote the safe and efficient movement of military vessel traffic and cargo of strategic military importance.*

This study is aligned with and guided by related international, national, interagency, departmental, and agency strategies/initiatives/policy and technical documents. Most notably:

- IMO and IALA charges to [“... Contracting Governments ... to provide, as ... practical and necessary ... such aids to navigation as the volume of traffic justifies and the degree of risk requires.”](#)
- [National Strategy for the MTS: Channeling the Maritime Advantage 2017-2022](#)
- [DHS 2023 Priorities 2/2/2023](#)
- [Coast Guard Strategy 2022-2026](#)
- [Commandant’s Intent 2022](#)
- [Coast Guard Maritime Commerce Strategic Outlook 2019](#) Line of Effort Two Modernizing Aids to Navigation and Mariner Information Systems, in particular, and corresponding [Implementation Plan 2020](#) elements.
- [Coast Guard Office of Navigation Systems Voyage Plan 2017-2022](#), [NAV 2025](#), and respective predecessor documents, all of which advocate for risk-based ATON design standards.
- Coast Guard ATON [Admin](#) and [Positioning](#) Manuals
- [DHS Risk Lexicon 2017](#) and [DHS Risk Management Fundamentals](#)

Situation

While Aids to Navigation mission authorities, objectives, and guiding principles endure, the role of SRA has changed within the modern navigation process. Today's navigators have access to accurate and continuously updated navigation information far beyond anything achievable by even the world's best pre-GNSS-ECS piloting teams. Under normal GNSS-ECS operating conditions short range aids corroborate modern navigation system information, afford an opportunity to detect system errors, and as part of the overall process help manage waterway transit risk to acceptable levels. Under disrupted GNSS-ECS scenarios, SRA design provides critical navigation resilience, holding waterway transit risk to acceptable levels.

The vulnerability of modern systems to disruption/failure is not in question. A 2021 Homeland Security Operational Analytics Center Study—[Analyzing a More Resilient National Positioning, Navigation, and Timing Capability](#)—found that "Fallback" technologies—for example, navigation by traditional visual or manual course plotting, positioning using reference points—increase the robustness of PNT nationally.

And recommended that:

- *Having diverse, time-proven, robust fallbacks to GPS available are highly desirable. Maintaining those capabilities while seeking the efficiency gains of modern PNT should be a priority.*
- *Dispersal and diversity of capabilities in the national PNT ecosystem is a strength, not a weakness.*
- *Considering both current and potential future systems, prudent system design necessitates avoiding dependencies that increase the risk associated with GPS loss.*

IALA's Waterway Risk Assessment Program [IWRAP] Mark II is the recognized highwater-mark for waterway risk analysis--takes AIS data, waterway dimensions, and bathymetric inputs to estimate probability of collisions, allisions, and groundings (CAG). The model takes historical data inputs to calibrate initial CAG frequency outputs. The model has many capabilities; however, it does not model consequence and does not model the risk mitigation impact of SRA. IALA has no firm plans currently to address these acknowledged shortcomings in this risk model.

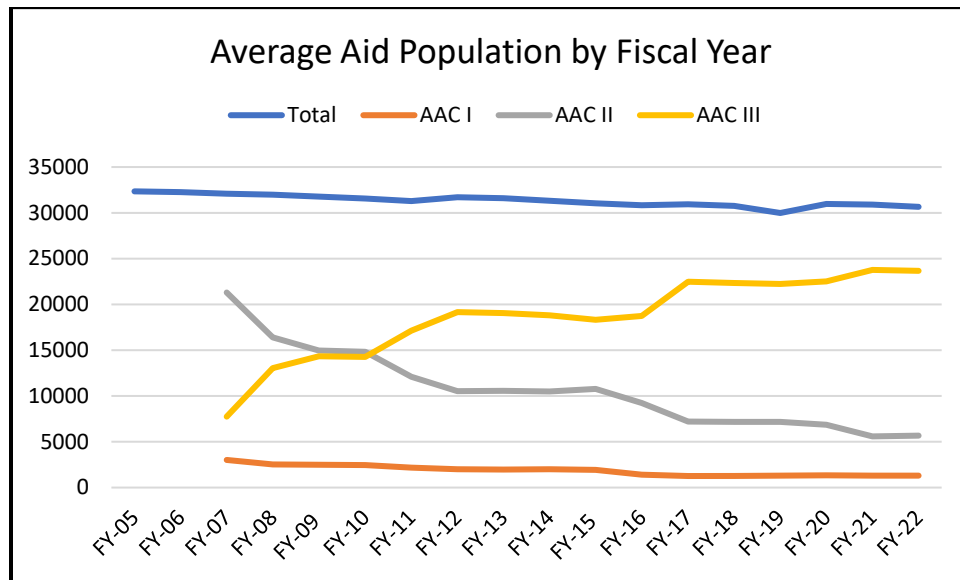
The Coast Guard has pursued risk-based SRA design since the 1980s. These efforts are detailed in [USCG R&D Center Report Historical Summary of Aids to Navigation Analyses April 1998](#) (CH-5 Aid System Use and Waterway Design). These efforts focused mainly on large vessels operated by licensed pilots in deep water channels. A series of such efforts culminated in the 1992 development of a deep-water SRA design tool, a relative risk tool, based on man-in-loop simulations measuring cross track error for various waterway dimensions, wind, current and visibility conditions, for various SRA design schemes. The approach modeled ship dimensions and attitude in a waterway; any ship contact with waterway boundaries scored as a grounding. Highest scoring design schemes had relative lowest cross track error and lowest probability of grounding. This work did not address consequence.

RDC [Final Report of Comparative Risk Model to Support Changes to Design Standards of USATON of November 2012](#) documented a prototype approach incorporating consequence.

Subsequent waterway risk assessment developments, mainly focused on Offshore Wind Energy issues, are covered in *Navigation Safety Modeling and Analysis Tool Summary Reports Phase I and II of October 2019 and December 2020*. The 2020 report recommended use of IALA’s IWRAP Mark II model with SME review to satisfy Coast Guard wind farm risk assessment review obligations.

The Coast Guard is currently pursuing quantitative risk-based design modeling capability via multiple tracks—CG Research and Development Center (RDC) FY24 Idea Submissions and DHS S&T University Programs Critical Infrastructure Resilience Institute (CIRI) (University of Illinois) but does not yet have that capability. Both two-year projects have been approved and kicked off. Outputs of these efforts will serve as inputs to the design module of the Coast Guard’s ongoing Waterways Analysis Management System (WAMS) 2.0 project.

Most fielded Shallow Waterway SRA designs are rooted in pre-GPS-ECS era, reflecting user engagement. The quantity of federal aids in the U.S. constellation peaked around FY05. [\[Voyage Plan\]](#) The below chart shows federal aid population, less Western River buoys, from FY 2005 through FY2022, [Aid Availability Categories I, II, and III](#), and total. [\[Link to Definitions\]](#) This data shows a reduction of 2,022 aids against a FY05 baseline of 35,782 for this set. Shallow Water Maintained-Not Maintained (SWM-SWNM) aids currently account for about 42-percent of the federal constellation, excluding Western Rivers buoys.



[\[Link to .xlsx data\]](#)

Approach – Aligned, Innovative, Intentional, Conservative, Risk-Informed

Recognizing the inherent risk management nature of waterway design, lacking a rigorous, quantitative, risk-based design-standard, and considering the following:

- Aid reductions taken since FY2005.
- A fully risk-based design standard is on the near to intermediate term horizon [2-5 years]
- The vital role of the MTS to national prosperity and security as articulated in the Coast Guard Maritime Commerce Strategic Outlook
- The importance of SRA to safe and efficient flow of commerce through the MTS under normal operations and under GNSS/eNAV disruptions, as regularly expressed by users, and
- The qualitatively sound SRA managed-risk return on investment

This study took a conservative, risk informed, incremental approach to adjusting the shallow waterway level of service, modeled on the DHS Risk Management Process. [Detailed at Appendices [A – Methodology](#) and [C – Workshop Plans](#)]



DHS Risk Management Process

The study completed the process through the *Develop Alternatives* Phase by making recommendations to the Chief, Office of Navigation Systems. The study identified discontinuance and relocation candidates for operational commander consideration during a later *Decide and Implement* Phase in facilitated workshops. Operational commanders will evaluate change candidates, decide appropriate changes, and develop implementation plans for approval per current policy. Operational commanders will then evaluate and monitor implementation, adapting as necessary.

The study assumes need for resilience against GNSS-ECS failure considerations. Notwithstanding, there are aids contributing less value to the overall system, in less critical segments of non-critical waterways that may also be unserviceable due to shoal datum. Removing or relocating these aids may improve waterway efficiency without increasing mariner risk.

What SWLOSS Found

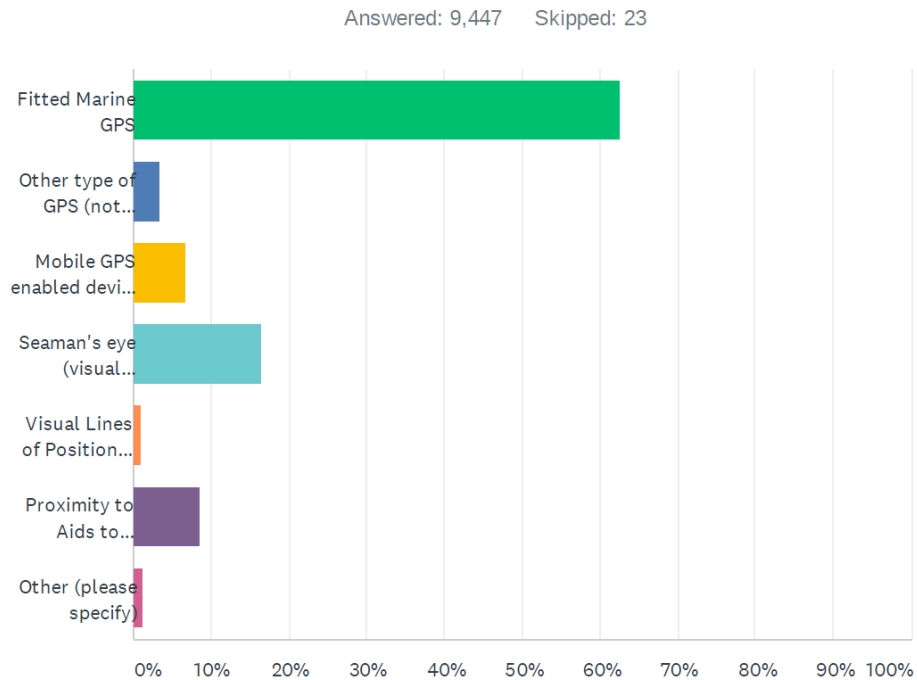
SWLOSS prepared a survey to capture information about users of Shallow Waterways, their vessels, their practices, their navigation gear, their assessment of the current system, and suggestions for improvements. See [Appendix B – Outreach](#) for details.

Information and survey links were posted in Local Notices to Mariners and distributed via the Coast Guard Boating Safety partner network. The survey was conducted online via Survey Monkey with almost 10,000 respondents. Survey participation was skewed towards recreational and experienced users.

Key survey findings:

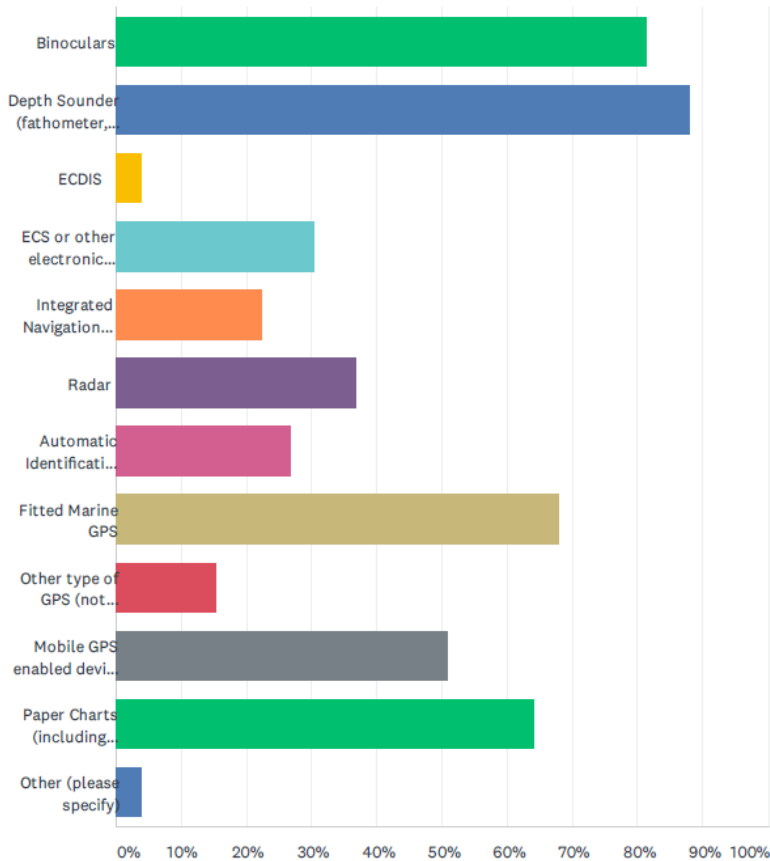
- Extensive use of GPS and ECS/chart plotter. [See charts below]
- Experienced users were generally satisfied with ATON services provided with improved discrepancy response and improved retro maintenance being common suggestions.
- Inexperienced users were less satisfied and asked for more aids, particularly more lighted aids.
- No one asked for fewer aids.

Q12 What is your primary positioning source?



Q13 What navigational equipment do you have onboard? Please check all that apply.

Answered: 9,439 Skipped: 31



Identified Shallow Water Aids

As a practical matter, this study considered aids designated as Waterway Type, Shallow Water Maintained [SWM] (federal project) or Shallow Water Not Maintained [SWNM] (Glossary) in the Coast Guard’s Aids to Navigation Information System [ATONIS] as of 8 February 2023. Intracoastal Waterway (ICW) aids, so designated are included. Western Rivers aids, so designated, are excluded, as they were subject of a separate Western Rivers Study. [Appendix A – Methodology]

These 14,611 in-scope aids [Link to .xlsx] [Link to GIS] represent:

- About one third of the total federal constellation [45,999] including Western Rivers buoys
- About 42-percent of the total Federal constellation not including the aids in the Western Rivers² [10,885 as of 27 February 2023]

² The number of buoys in the Western Rivers varies between 10 and 12 thousand, depending on river conditions.

The study identified 10,889 aids in SWM waterways and 3,722 in SWNM waterways. ICW aids account for about one third of shallow water aids. Of the shallow water aids, 9,685 have datum [found or set depth] of less than six feet. [\[Link to .xlsx\]](#) [\[Link to GIS\]](#)

The table below and linked attachments introduce the concepts of [Waterway Criticality](#), [Discrepancy Response Factor I](#), and how they relate to [Aid Availability](#).

Aid Availability Matrix

WAMS Criticality Group	DRF1 Score Category				
	1	2	3	4	5
[1-CM]	I	I	I	II	II
[2-CEN]	I	I	II	II	III
[3-CE]	I	II	II	III	III
[4-CN]	II	II	III	III	III
[5-NN]	II	III	III	III	III

Aid Availability Category – Definitions – Performance Objectives

AA Category	Definition	Objective
I	Vital Navigational Significance	99.8%
II	Important Navigational Significance	99.0%
III	Necessary Navigational Significance	97.5%

The 14,611 shallow water aids are shown in the same matrix structure below.

SWLOSS Aids Distribution in Aid Availability Matrix [\[Link to .xlsx\]](#)

Aid Availability Matrix – District - All

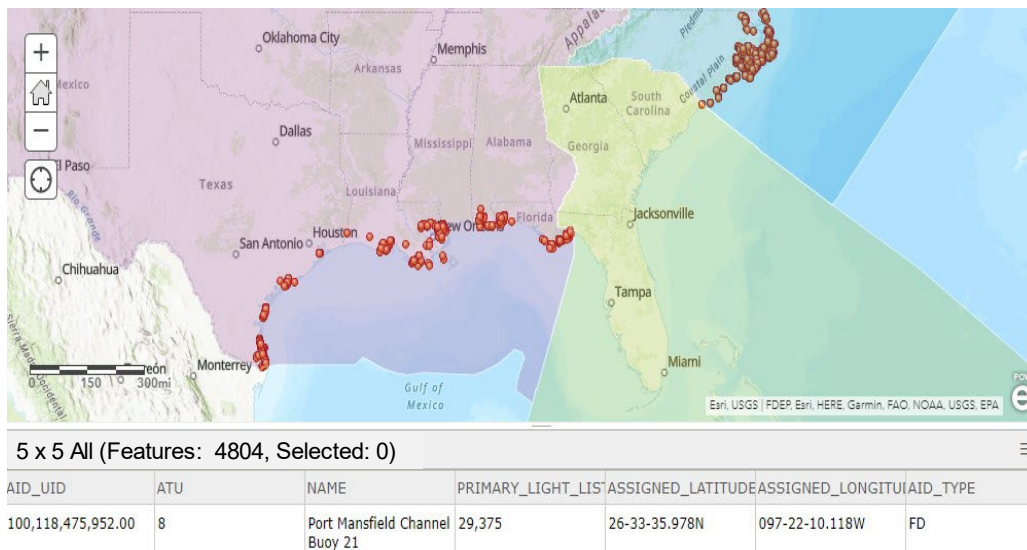
WAMS Criticality Group	Aids Per Group	DRF1 Score Category					
		1	2	3	4	5	Blank
[1-CM]	464	0	23	42	67	332	0
[2-CEN]	5098	5	20	59	172	4804	38
[3-CE]	1933	2	25	55	71	1779	1
[4-CN]	735	2	5	17	50	659	2
[5-NN]	5326	1	7	23	68	5215	12
Blank	1055	1	5	5	7	1033	4
Sum	14611	11	85	201	435	13822	57

District level breakdowns are available [here](#).

Study analysis discovered several data issues, principal of which:

- ATONIS contained 4693 Waterway Type Blanks [[Link to .xlsx](#), [Link to GIS](#)], a significant share of which should be recorded as SWM or SWNM. An estimated 25-45-percent of the waterway type blanks may be SWM-SWNM (~1173-2112 aids).
- Of the 14,611 aids in designated Waterway Type SWM or SWNM, 1,055 records contained Waterway Criticality Group (WCG) blanks [[Link to .xlsx](#), [Link to GIS](#)]
- The vast majority of CGDSEVEN aids were designated as Environmentally and Navigationally Critical [2-CEN], although some were designated as Militarily Critical [1-CM]. [[Link to .xlsx](#) for completed analyses, all D7, all D7 SWLOSS, D7 SWLOSS Phase One, D7 SWLOSS Phase Two]. This may artificially inflate the significance of D7 aids compared to aids located in other districts. The below graphic, excerpted from CG-ArcGIS SWLOSS showing SWLOSS aids in non-critical waterways (WCG [5-NN]) with low DRF1 Scores (DRF1 Score Category 5), contrasts the application of WAMS Criticality Group criteria across district lines.

WAMS Waterway Criticality Group [2-CEN] Anomaly



These data issues have been communicated to operational commanders and will be addressed in advance of or during the workshops to the maximum extent possible.

Candidates for Change Consideration

The study identified candidates for change consideration. The filtering process is detailed at Appendix A – Methodology and summarized below.

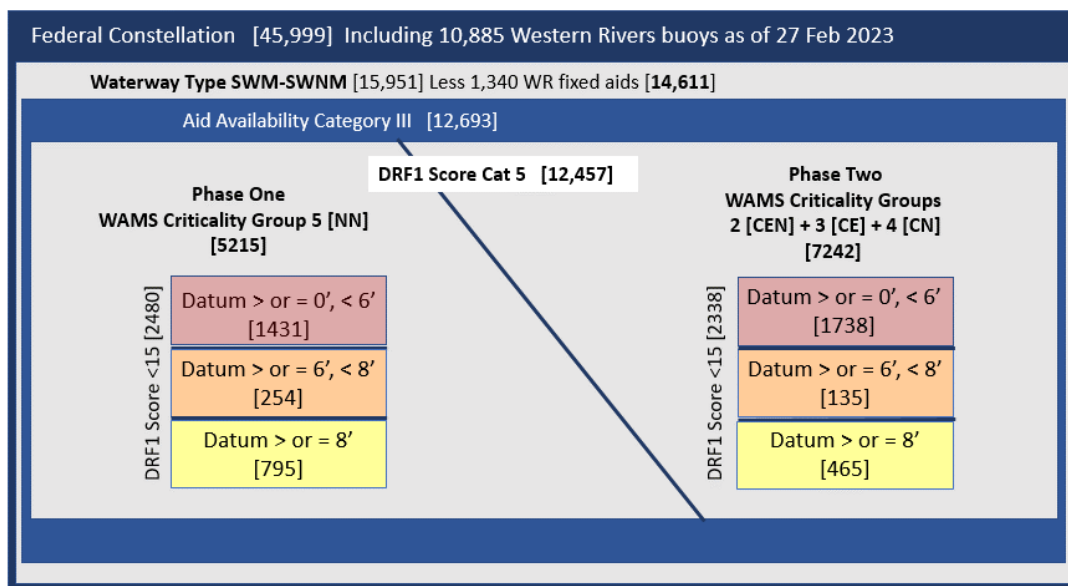
While the data are imperfect, they are sufficient to identify candidates for change consideration, subject to district waterway staff validation at planned workshops.

The study used ATONIS data to identify change consideration candidates:

- With the least system value, as indicated by low DRF1 scores [less than 15] within the lowest DRF1 Score Category [DRF1 Score Cat 5]
- Within the least critical waterways, as indicated by the lowest WAMS Criticality Group, Non-Critical Waterways [5-NN]

The study identified a subset within the [5-NN] X DRF1 Cat 5 cell of serviceability problematic aids, as indicated by datums [set or found] of less than six feet, to be considered as priority change candidates with the potential to realize efficiency and relieve serviceability challenges. Recognizing a degree of noise in the data, and the artificiality of a bright line at six feet, the study identified a complementary subset with datums less than eight feet to provide a margin allowing for the realistic identification of servicing problematic aids.

Recognizing that there are many AA Cat III Shallow Water aids in DRF1 Score Category 5 on serviceability problematic stations, with DRF1 scores below 15, and that many of these aids may be relocated with little or no risk impact, the study identifies such problematic stations in Waterway Criticality Groups [2-CEN], [3-CE], and [4-CN] as candidates for relocation consideration in a second phase, at a to be determined time after Phase I implementation plan approvals. Change candidate filtering described above is summarized in the diagram below.



The Phase I table below shows change candidates identified within the 5,215 aids in AA Matrix cell WWC [5-NN] X DRF1 Cat 5 – on the left in the above diagram. While discontinuation candidate identification pends track keeping segment designations, design criteria and change management limits set per segment and per waterway will make discontinuations a small subset. Discontinuation eligibles will include candidates from all three shaded areas, based on DRF1 scores below 15 and track keeping attributes. Data suggests row one shaded candidates are likely serviceability problematic. Datum data uncertainties suggest a simple line at less than six feet may not be adequate to identify all serviceability problematic aids. Row two extends the indicator to less than eight feet. Workshop preparation and execution processes will mitigate datum data uncertainties for effective outcomes.

Phase I – Discontinuations and Relocations [\[Link to .xlsx\]](#), [\[Link to GIS\]](#)

Shallow Water Aids - AAC III DRF1 Cat 5 - WCG-5 [NN] Only (5215)

Datum	Total Aids	Subset of DRF1 < 25	Subset of Floating < 25	Subset of Fixed < 25	Total DRF1 < 15	Subset of Floating < 15	Subset of Fixed < 15
0ft or Greater, < than 6ft	3120	2759	567	2192	1431	317	1114
6ft or Greater, < than 8ft	461	429	318	111	254	198	56
8ft or Greater	1630	1458	1155	303	795	643	152

*Note: Data of four (4) aids included in this set have negative datums and are therefore not included in the table.

The Phase II table below shows relocation change candidates for the 7,242 aids in this subset of WAMS Criticality Groups CEN-2, CE-3, CN-4 X DRF1 Score Category 5, the remaining AA Category III aids in the DRF1 Score Category 5 [on the left in the diagram above]. Row 1 aids are priority change candidates with the greatest potential to relieve serviceability issues. The study proposes no hard limits on relocations. Relocations subject only to district waterway staff feasibility, utility, needs of navigation judgment. As in Phase One, low DRF1 scores and servicing problematic datum determine change candidacy.

Phase II – Relocations Only – Datums < 8-ft Only – Primary Candidates < 6-ft [[Link to .xlsx](#), [Link to GIS](#)]

Shallow Water Aids - AAC III DRF1 Cat 5 - WCG 2-4 [CM, CEN, CE, CN] (7242)							
Datum	Total Aids	Subset of DRF1 < 25	Subset of Floating < 25	Subset of Fixed < 25	Total DRF1 < 15	Subset of Floating < 15	Subset of Fixed < 15
0ft or Greater, < than 6ft	5016	4094	435	3659	1738	210	1528
6ft or Greater, < than 8ft	453	368	188	180	135	73	62
8ft or Greater	1768	1287	644	643	465	238	227
*Note: Data of five (5) aids included in this set have negative datums and are therefore not included in the table.							

Aids in the shaded cells in the tables above are color coded and displayed in CG-ArcGIS against an ENC base layer that will allow district decision makers to view change candidates in waterway context with maximum available chart detail. [Links above]

[Collision, Allision, and Grounding data](#) [causes other than mechanical failure] and AIS traffic data are provided in additional layers. [AIS Traffic] CAG data for most recent ten years provided by Commandant (CG-ENV) from Marine Information for Safety and Law Enforcement (MISLE) database. AIS traffic layer provided by NAVCEN.

These spreadsheets and GIS-spreadsheet integrated layers should enable successful decision making and implementation planning phases at planned workshops.

Special Issues

Office of Navigation Systems leadership added other study objectives to the SWLOSS.

Least Serviceable Depth [Datum]

The SWLOSS examined a notional least serviceable depth of six feet. ATONIS shows almost 10,000 [9,685] of the 14,611 or just over 66-percent of SWM-SWNM aids have a datum [found or set] of less than six feet. The study identifies 1,431 of these [with DRF1 scores of less than 15] as candidates for discontinuation/relocation in Phase I. The study identifies another 1,738 of these for relocation in Phase II. Together these candidates account for about one third of the 9,685 aids on stations in less than six feet. Many of these may be relocated on a three-to-five-year timeline. The vast majority of less than six-foot datum aids have existed/been maintained for decades, engendering the waterway stakeholder's dependence, and setting expectations of service. Change management realities suggest a more methodical approach to reducing aids in these waterways to better account for the perceived impact to the stakeholder groups. The study proposes a national strategy of discontinuing/relocating these stations through careful change management over a number of years, as opportunities present, including through withdrawal actions, as addressed later in this section. To the extent practical, no new stations should be established with a datum of less than six feet.

Apalachicola-Chattahoochee-Flint Rivers System

This Western Rivers Study segment was rolled over into SWLOSS as the waterway situation was politically undetermined at the time. [<https://www.sam.usace.army.mil/Missions/Planning-Environmental/ACF-Master-Water-Control-Manual-Update/ACF-Document-Library>] [Developer Study attached at [Appendix B - Outreach](#)]

There is no program basis for federally marking these waterways based on use over a greater than 10-year period. The absence of commercial traffic is due primarily to unresolved environmental issues at the Gulf end of the Apalachicola. There are dredging spoils issues that make continued dredging unfeasible, commercial navigation impossible and have caused the USACE to stop lock and dam maintenance; leading to lock deterioration to the point of inoperability. There has been conversation about FY24 funding to pursue lock and dam repairs. There is also evidence of some movement on the dredging spoils environmental issues. Sector Mobile's recently completed WAMS advised no action at this time, pending FY24 budget developments. Plans to reprogram ANT EUFALA resources are on hold until FY24 budget is published.

Additional Background. ACF is a collection of federal projects. USACE built three dams and locks of concern as part of the multi-purpose project. Environmental issues around dredge disposal at the Apalachicola River, Gulf access, end of the system prevented dredging to maintain project depth and cut off practical commercial use. USACE dams and locks fell into disrepair as navigation maintenance did not compete with cost beneficial priorities. The locks are currently inoperable. Internal USACE budget process repair proposals failed the USACE cut, even in the context of federal infrastructure investment emphasis. The Coast Guard included withdrawal and ANT EUFAULA closure in the FY15 budget. Those plans were abruptly dropped when Senator Shelby, then Chair, Senate Appropriations, and other legislators objected on behalf of constituents. The bass boat and pontoon boat recreational users have no need for these federal aids. The only respondents to Sector Mobile's WAMS outreach were associated with development interests hoping to restore some level of practical navigability. Alabama, Georgia, and Florida

Congressional delegations were all represented in March 2022 SWLOSS/ACF WAMS Eufaula outreach meetings with USACE and development advocates, industry, and environmental stakeholders. USACE sources indicate possibility/likelihood of substantial lock and dam repair funding in FY24. [[Appendix B – Outreach – ACF](#)]

Conditions for Withdrawal

The Office of Navigation Systems leadership tasked SWLOSS to develop policies for withdrawal under marginal marking circumstances, including:

- Waterways not federally charted
- Severe shoaling without dredging prospect (e.g., Virginia Inside Passage)
- Dynamic shoaling without appropriate survey support (inlets/passes)

Coast Guard principles maintain a bias for service. Where the criteria for establishing a system remain valid, the Coast Guard will do everything within its authority, capability, and capacity, subject to limits of safety/feasibility, in coordination with its federal partners to continue to operate and maintain systems to deliver appropriate levels of service.

The [ATON Admin Manual](#) lays out detailed criteria for establishment of ATON. Systems not meeting these criteria are candidates for withdrawal. Withdrawals will almost always have potential political sensitivities. Contemplated withdrawal actions should always be undertaken in close coordination with internal public affairs/external relations chains.

The [ATON Admin Manual](#) makes the following statement with regard to particular circumstances:

The Commandant will strongly support all justified, reasonable requests to improve, add, change, or remove aids to improve the effectiveness and overall operating economy of the aids to navigation system.

The Commandant will particularly support requests for reduction in number or replacement with more effective aids in cases of:

- *Aids previously established to meet requirements which no longer exist.*
- *Too many aids in the same area having the effect of confusing the mariner.*

The following considerations shall be made respective to the considered conditions for withdrawal:

- Waterways not federally charted. ATON are designed for use with charts. Lack of federal charting is indicative of marginal federal cost-effectiveness, as expressed by charting agencies. Lack of federal charting alone is not considered a sufficient basis for withdrawal. In situations where there is no charting, even qualified commercial charting, the need for withdrawal is indicated. Marginal charting conditions should trigger a Waterway Assessment focusing on user groups and their reliance on existing federal aids (e.g., the vessels operating in each area, may not use either charts or ATON). In waterways where federal charting and ATON marking services are found not cost-beneficial, and without reasonable prospect of becoming so, state, or private aid solutions may be options.
- Severe shoaling without dredging prospect. The Virginia Inside Passage provides an excellent example of successful withdrawal, although undertaken late. The situation was characterized by engagement

and coordination with federal, state, local, tribal, private partners and stakeholders and all required notices. Lessons learned from this example include:

- In instances where progressive deterioration seems inevitable, early engagement is imperative, especially with federal partners. *In extremis* is not the time to first table the issue. If deterioration to failure seems inevitable, all involved should be preparing for the withdrawal of federal ATON if saving the waterway is not possible/appropriate.
 - In the interim stages, e.g., affected stretches of ICW, where not maintained to project depth, but still capable of supporting a cost-beneficial level of navigation, the Coast Guard will mark safe water and provide marine safety information appropriate to the circumstances.
 - The need for withdrawal of federal ATON is indicated when the waterway is no longer capable of supporting cost-beneficial navigation / is not safe for navigation / cannot be practically or safely maintained.
- Dynamic Shoaling without appropriate dredging/survey support. This may be the most challenging and most common of these three problem conditions. In such passes/inlets, the central challenge is knowing where the passable channel is and its depth, so that the Coast Guard can mark safe water and share appropriate Marine Safety Information. Survey quality and refresh rate must be appropriate to the dynamic. The dynamic may be such that it becomes infeasible to keep up with marking the shifting channel, even if appropriate surveying were available. In dynamic shoaling areas, the following aspects may be considered:
 - Coast Guard aids to navigation cannot lead operators into danger.
 - All reasonable actions necessary to safely mark these waters are encouraged.
 - Where the limiting factor is not the quality/rate of survey, but Coast Guard ability to keep up with physical marking/to safely do so with Coast Guard assets, then AIS-ATON marking should be considered where feasible, together with marine safety information sharing the location of safe water boundaries. While these alternatives may require use of AIS/GNSS-ECS/chart-plotter tools, they may constitute the only safe options.
 - Where the quality/rate of survey is the problem, the most appropriate option may be to withdraw, advertising the conditions, with transit at own risk/closing to navigation.

Recommendations

The SWLOSS makes the following recommendations:

1. Accept the NNAVSAC Resolution #23-02 definition of the term “prudent mariner,” in the context of CFR Aids to Navigation mission guidance; affirm assumptions that:
 - a. *Modern prudent mariners for whom aids to navigation signals are designed are compliant with all applicable navigation regulations and avail themselves of GNSS-ECS/chart plotter capabilities, as circumstances may require.*
 - b. *Modern accepted navigation practice includes the use of GNSS-ECS/chart plotters / AIS as circumstances may require.*
2. Approve proposed Phase I discontinuation candidate criteria for SWM and SWNM waterways. Any identified change candidate, at the discretion of operational commander, not to exceed 34-percent of aids in any track keeping segment, or 20-percent of aids in any one waterway. Discontinuations will not be effected until after public notification required by current policy. Issue Phase II discontinuation guidance, if and when necessary.
3. Approve criteria for identifying relocation candidates in Phase I and II without any hard count caps, subject only to degree of serviceability challenges and needs of navigation at the discretion of operational commanders.
 - a. In Phase I
 - i. Aid Availability Category III aids, in Non-Critical Waterways with DRF1 score of less than 15 and datum less than six feet, as priority candidates
 - ii. As above, except for datum of six or more feet but less than eight feet, as secondary candidates
 - b. In Phase II
 - i. Aid Availability Category III aids, in Critical Waterways [CEN, CE, CN] with DRF1 score of less than 15 and datum of less than six feet, as priority candidates
 - ii. As above, except for datum of six or more feet but less than eight feet, as secondary candidates.
4. Approve proposed changes to the current track keeping design standard for day and night aid visibility requirements for SWM waterways. For reference, the current Night Standard states: During nighttime, a mariner aboard a vessel constrained to the channel by her draft should see at least two lighted aids forward, on at least one side of the channel, from any position in the waterway, 80-percent of the nights of the year. Vessels not so constrained, such as small boats or vessels transiting open bays or sounds, need only see one light forward.
 - a. Proposed Night Design Standard Change for vessels constrained to channel by draft, from “should see at least two lighted aids forward”, to “should see at least one fixed light, or any two lighted aids forward”. All other night design requirements to remain in effect.
 - b. For Day Standards, A parallel change to that of nighttime standard.
 - c. Current standards for maximum spacing of two miles, where no range is present/landmarks are lacking, remain unchanged.

5. Approve Workshop Approach and Plans, including official notice of major data issues, guidance for review, validation/correction—Waterway Type blanks, Waterway Criticality Group blanks, D7 Waterway Criticality Group [2-CEN] issues.
6. Recommend after Navigation Division review, with appropriate adjudication, a reasonable opportunity for District Waterways review and comment before finalizing study report.
7. Engage other stakeholders as deemed appropriate.
8. Devise a plan to track progress against approved implementation plans.
9. On availability of quantitative risk-based design tools, review, and revise plans, as appropriate.
10. Continue to press for appropriately rigorous, quantitative risk assessment and analysis capabilities, to enable risk-based SRA design standards and acceptable risk, acceptable cost program performance.

Glossary of Aids to Navigation Terms

1. Adrift - Afloat and unattached in any way to the shore or seabed.
2. Aid to Navigation - Any device external to a vessel or aircraft specifically intended to assist navigators in determining their position or safe course, or to warn them of dangers or obstructions to navigation.
3. Assigned Position - The latitude and longitude position for an aid to navigation.
4. Availability (also technical availability) - The probability an aid or system of aids performs its required functions under stated conditions at any randomly chosen instant in time. Often expressed as a percentage.
5. Availability Standard - The minimum operational availability goal.
6. Bifurcation - The point where a channel divides when proceeding from seaward, the place where two tributaries meet.
7. Broadcast Notice to Mariners - A radio broadcast designed to provide important marine information.
8. Commissioned - The action of placing a previously discontinued aid to navigation back in operation.
9. Conventional Direction of Buoyage - Some reference direction for defining the lateral and numbering significance of an aid system. In U.S. waters, the direction of flood current provides the most common indication. For coastal marking, the conventional direction of buoyage is southerly along the East coast, northerly and westerly along the Gulf coast and northerly along the West coast.
10. Cutoff Turn - A type of dredged channel configuration where the triangular area formed by slicing off the inside corner or apex of a turn is incorporated into the channel, thus effectively increasing the available maneuvering room.
11. Daymark - Daytime characteristic of an aid to navigation.
12. Dead Weight Tonnage (DWT) - The capacity in long tons of cargo, passengers, fuel stores, etc. of a vessel. The difference between loaded and light displacement tonnage.
13. Direct Monitoring - A person assigned to keep watch over an aid's performance; requires a 24-hour watch within sight of the major aid.
14. Discontinue - To remove from operation (permanently or temporarily) a previously authorized aid to navigation.
15. Discrepancy - Failure of an aid to navigation to maintain its position or function as prescribed in the Light List.
16. Establish - To place an authorized aid to navigation for the first time.
17. Exposed Locations - Offshore areas which are not sheltered by adjacent land and thus may be exposed to extreme weather and sea conditions.
18. Extinguished - A lighted aid to navigation which fails to show a light characteristic.

19. Focal Plane Height - Height above water from the focal plane of the fixed light to mean high water (low water datum for Great Lakes), in feet.
20. Fog Detector - An electronic device used to automatically determine conditions of visibility which warrant the activation of a sound signal or additional light signals.
21. Highest Astronomical Tide (HAT) - The highest tide level that can be predicted to occur under average meteorological conditions and any combination of astronomical conditions.
22. Inoperative - Sound signal or electronic aid to navigation out of service due to a malfunction.
23. Junction - The point where a channel divides when proceeding seaward. The place where a tributary departs from the mainstream.
24. Link Monitoring - Remote monitoring by means of electronic data gathering and reported via radio and/or landline to a master monitor location.
25. Local Notice to Mariner - A written document issued by each U.S. Coast Guard district to disseminate important information affecting aids to navigation, dredging, marine construction, special marine activities, and bridge construction on waterways within the district.
26. Luminous Range - The distance at which a light is visible based on the visibility of the area.
27. Mariner Monitoring - Passing ships' masters or pilots report aid failures when observed.
28. Mark - An artificial or natural object of easily recognizable shape or color, or both, situated in such a position that it may be identified on a chart. (An aid to navigation.)
29. Nominal Range - The nominal range is the luminous range of a light when the meteorological visibility is 10 nautical miles, and a threshold of illuminance of 0.67 sea-mile candela is used.
30. Off Station - A floating aid to navigation not on its assigned position.
31. Operational Availability - The availability, to a mariner with at least a fifteen-foot height of eye of a specific aid at a specific distance. Example: The operational availability of a certain light, viewed from a distance of two miles, might be 65%. That is to say, based on historical visibility data, a mariner can see that aid at least two miles away 65% of the time.
32. Operational Range - The distance at which a light is required to be seen to meet the user requirements.
33. Protected Locations - Inshore areas that are not exposed to extremes of weather and sea conditions.
34. Quarterline - A line parallel to the channel centerline, equidistant from the centerline and the channel edge.
35. Redundancy - A desirable attribute of an aid system intended to prevent the failure of one aid from significantly degrading the effectiveness of the entire system.
36. Reliability - The probability an aid or system of aids performs its required functions under stated conditions for a specified period of time. Often expressed as a percentage.
37. Relighted - An extinguished aid to navigation returned to its advertised light characteristics.
38. Replaced - An aid to navigation previously off station, adrift, or missing, restored by another aid to navigation different type and/or characteristic.

39. Reset - A floating aid to navigation previously off station, adrift, or missing, returned to its assigned position (station).
40. Semi-Exposed Locations - Offshore or inshore areas that may be sheltered by adjacent land and are exposed to lesser extremes of weather and sea conditions.
41. Shallow Water – Maintained (SWM). These waterways are generally restricted by nature, are assigned a project depth, and may require periodic dredging to maintain that project depth. The waterway depth is 12 feet or less.
42. Shallow Water – Not Maintained (SWNM). These waterways are generally unrestricted. The channel boundaries are not delineated; however, ATON may be established to mark a desired depth or hazard. The waterway depth is 12 feet or less.
43. Sound Signal - A device which transmits sound intended to provide information to mariners during periods of restricted visibility and foul weather.
44. Structure Height - Height from *terra firma* or seabed to the highest point on the structure, excluding the uppermost optic.
45. System of Aids - A group of interacting aids to navigation intended to collectively provide sufficient and timely information with which to safely navigate vessels within and through a waterway. For example, systems may range in size from all the Western Rivers to the waters serving a small fishing port, i.e., Sitka Harbor System.
46. Temporary Change - An USCG approved, intentional change to the authorized characteristics of an aid to navigation. This does not include temporary responses to a discrepancy, such as setting a TRUB in lieu of a destroyed DBN.
47. Temporary Response – The date and time at which a unit completes temporary corrective action to a discrepancy but does not completely restore the aid to watching properly status. This information is to be entered in I- ATONIS in the Temp Response DTG field.
48. Watching properly - An aid to navigation on its assigned position exhibiting the advertised characteristics in all respects.
49. Waterway - A water area providing a means of transportation from one place to another, principally a water area providing a regular route for water traffic, such as a bay, channel, passage, river, or the regularly traveled parts of the open sea.
50. Withdrawn - The discontinuance of a floating aid to navigation during severe ice conditions or for the winter season.

Acronyms List

1. ACF – Apalachicola-Chattahoochee-Flint.
2. AIS – Automatic Identification System
3. ATONIS – Aids to Navigation Information Systems
4. ATONS - Aids to Navigation Systems.
5. CG-5PW – Coast Guard Marine Transportation Systems.
6. CMTS – Committee for Marine Transportation s.
7. DHS – Department of Homeland Security.
8. DWT – Dead Weight Tonnage.
9. ECDIS – Electronic Chart Display and Information Systems.
10. GNSS-ECS – Global Navigation Satellite System – Electronic Chart System.
11. GPS – Global Positioning System.
12. IALA – International Association of Maritime Aids to Navigation and Lighthouse Authorities.
13. IMO- International Maritime Organization.
14. MTS – Marine Transportation System.
15. SRA – Short Range Aids to Navigation.
16. SWLOSS – Shallow Water Level of Service Study.
17. SWM – Shallow Water Maintained.
18. SWNM – Shallow Water Not Maintained.
19. USATONS – United States Aids to Navigation.
20. VTS – Vessel Traffic Services.
21. WCG – Waterway Criticality Group.

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Appendices

Appendix A – Methodology

Methodology – General.

This Appendix addresses the methodology used to identify SWLOSS aids within the federal constellation and to identify candidates for change consideration. Operational commanders will consider change candidates for discontinuation or relocation action via facilitated workshops, subject of Appendix C – Workshop Plans.

Determining SRA level of service is fundamentally a risk management exercise. The DHS Risk Management Cycle, as laid out in [DHS Risk Management Fundamentals](#), provides the overarching methodology structure. All fundamentals apply.



DHS Risk Management Cycle

Define the Context.

This section defines and frames the context of decisions and related goals and objectives. [Strategic alignments are addressed in the main report.]

[IALA Level of Service Guideline G1004 \[Edition 3 July 2022\]](#) describes level of service as “the commitment of service by the Competent Authority to mariners who are navigating or operating in an area ... for the provision of the relevant service.” The guideline indicates that a level of service statement should include type, extent, quality components.

- Where “type” describes what the competent authority will provide. In this case short range aids, visual and AIS.
- Where “extent” describes where and why a service will be provided. As the volume of traffic justifies and the degree of risk requires. [Title 33 CFR, parts 60 through 76](#) provide the regulatory guidance for the authorities granted in the U.S. Code. Section 62.1(c) defines the scope of USCG responsibilities for ATON.

“Level of Service is what is charted.” [... and maintained to aid availability standards.]

--- Omar Eriksson, Deputy Secretary General, IALA

The study is guided by general principles that all programs should operate cost-effectively, economically, with appropriate resilience against all threats to required program performance. [\[OMB Circular A-123\]](#)

Navigation, Level of Service, and Risk Management

Navigation is a process. Prudent mariners navigate using all reasonably available means, appropriate to the waterway and conditions. Safe navigation requires an effective partnership, including vessel operators/pilots, vessel owners, GNSS providers, navigation equipment makers/maintainers/standards developers; regulators, rules of the road makers/maintainers; chart makers [primarily NOAA/USACE/NGA], physical waterway shapers/maintainers [primarily USACE], Short Range ATON (SRA) providers/maintainers [primarily USCG], marine safety information providers/disseminators [primarily USCG], among others.

Transit risk is a function of the probability/frequency of collisions, allisions and groundings (CAGs) and the consequences of such incidents. The volume and nature of traffic [length, beam, draft], navigation system conditions and vessel capabilities, maneuverability, levels of rules of the road compliance, waterway dimensions, bathymetric features, weather conditions, and SRA marking, among others are factors affecting probability of CAGs. Incident consequences include loss of life, injury, environmental damages, physical damages to vessel(s)/affected structures, costs of MTS disruptions which vary with incident severity, vessel attributes, crew size, fuel carried, bathymetric attributes [hard/soft bottom, nature of hazards], adjacent population densities, environmental sensitivities, and cargoes, among others.

While the stated purpose of the ATON mission is “*to mitigate Marine Transportation System [MTS] transit risks by reducing the potential for collisions, allisions, and groundings,*” managing transit risk [expected losses] to accurate, quantitative acceptable levels at acceptable cost [as the volume (and nature) of traffic justifies and the degree of risk requires] is a worthy, but not yet attained goal [on the few years horizon].

Unlike previous studies in this series, SWLOSS does not designate study-level design vessel(s) due the great diversity of included waterways and their respective users. The study embraces the principles that short range aids to navigation systems are designed at the waterway level, to assist *prudent mariners* in the process of navigation, guided by the Waterway Analysis and Management System (WAMS), primarily for vessels constrained to channel by draft, and generally for the largest/largest 85% users. Design vessel(s) will be identified for each affected waterway at the Decide and Implement Stage, as part of the workshop process.

Identifying the Risk. This step in the risk management process identifies the risks associated with the goals and objectives. The primary risk associated with SWLOSS goals and objectives is overreach.

SWLOSS focuses on defining the SRA minimum acceptable level of service for U.S. navigable waters of less than twelve feet in depth. It focuses on SRA contributions to managing transit risks under normal and GNSS disrupted operating conditions. Defining level of service is fundamentally a risk management exercise.

In current SRA management practice, risk is assessed qualitatively by subject matter experts. While the Coast Guard is currently pursuing multiple opportunities to develop rigorous, quantitative, risk-based SRA design tools, they are not yet available. [IALA’s IWRAP Mark II is accepted as the global highwater mark. IWRAP Mark II uses AIS data, channel dimensions, and chart bathymetric data to estimate probabilities of collisions, allisions and groundings. IWRAP does not “see” aids to navigation, much less estimate their risk mitigation effect, IWRAP Mark II does not address consequences. Changes in performance are measured by changes in probabilities.]

Given that SRA efficiencies of almost six percent have been realized since 2006 [against an ATONIS baseline of 35,782] [Voyage Plan], and that qualitative techniques are not truly adequate to the task, the study takes a conservative risk management approach—in the interest of avoiding penny-wise and pound-foolish outcomes—using available tools and available data to responsibly define an interim shallow water minimum level of service, and a risk responsible efficiency increment, without overreaching current capability limits, pending the availability of more appropriate risk management tools.

Assess and Analyze Risk. The study team reviewed federal aid data from the Coast Guard ATON Information System (ATONIS). The team worked with database subject matter experts to develop a query isolating required fields from the more than 35,000 aid records in ATONIS. The study refreshed the query on 2 May 2022 and 8 February 2023. Results are based on the most recent query.

The study team used Waterway Types SWM (Shallow Water Maintained) and SWNM (Shallow Water Not Maintained) to capture all aids of interest. After applying filters to screen out aids not in scope, e.g., Western Rivers fixed aids, the team identified 14,611 in scope, shallow water aids.

The study team decided to focus on aids adding least system value, in least critical waterways as a logical point of departure in determining a new level of service/identifying potential efficiencies. ATONIS uses Discrepancy Factor 1 scores to categorize aids by functional significance. [See Attachment 2] ATONIS uses WAMS Criticality Groups to categorize waterways by criticality. [See Attachment 3]

The Coast Guard uses DRF1 Score Category and WAMS Criticality Group to determine Aid Availability Category [See Attachment 4] Aid Availability Category determines individual aid performance reliability requirements. This Aid Availability Category Matrix provides a very useful framework to understand and examine the significance of aids within the system.

Aid Availability Matrix [WAMS Criticality Group X DRF1 Score Category]

WAMS Criticality Group	DRF1 Score Category				
	1	2	3	4	5
[1-CM]	I	I	I	II	II
[2-CEN]	I	I	II	II	III
[3-CE]	I	II	II	III	III
[4-CN]	II	II	III	III	III
[5-NN]	II	III	III	III	III

Aid Availability Category – Definitions – Performance Objectives

AA Category	Definition	Objective
I	Vital Navigational Significance	99.8%
II	Important Navigational Significance	99.0%
III	Necessary Navigational Significance	97.5%

The matrix below shows SWM and SWNM aid distribution within the Aid Availability Matrix for the 8 February 2023 query.

SWLOSS Aids Distribution in Aid Availability Matrix [Link to .xlsx]

Aid Availability Matrix				District	All		
WAMS Criticality Group	Aids Per Group	DRF1 Score Category					
		1	2	3	4	5	Blank
[1-CM]	464	0	23	42	67	332	0
[2-CEN]	5098	5	20	59	172	4804	38
[3-CE]	1933	2	25	55	71	1779	1
[4-CN]	735	2	5	17	50	659	2
[5-NN]	5326	1	7	23	68	5215	12
Blank	1055	1	5	5	7	1033	4
Sum	14611	11	85	201	435	13822	57

Given study objective to identify a least serviceable depth, driven by servicing asset accessibility and ATON mooring system limitations, the study team sought to further filter SWM-SWNM aids by datum. ATONIS fields capture set and found datum, with different recording requirements for fixed and floating aids. The team identified aids with datum found or set of less than six feet as potentially serviceability problematic, and subsequently with greater than or equal to six feet and less than eight feet to widen consideration allowing for data uncertainties, practical considerations.

Review of query results also revealed a substantial number of data field blanks which hindered isolation and identification of those shallow water ATON meeting desired parameters.

- Waterway Type. Almost 5000 blanks in this top line filter, Western Rivers aids in ATONIS excluded.
- WAMS Criticality Groups. More than 1100 blanks within the SWM-SWNM subset.
- Datum Set and Found. Issues with blanks/anomalous set and found entries.
- Other. All D7 SWM-SWNM aids designated as WAMS Criticality Groups [1-CM] and [2-CEN].

The team communicated these issues to District Waterway Managers, requesting review, and validation or correction.

The team conducted several NAV internal briefs, numerous informal communications with district waterways management staffs, and formal briefings at Senior Officer Aids to Navigation Conferences 2021 and 2022.

The team conducted outreach via survey (all users) [Appendix B - Outreach]. The team corresponded with American Waterway Operators (AWO) by correspondence [AWO Response]. The team met with and corresponded with BoatUS.

Developing Alternatives.

The below table shows change discontinuation/relocation candidates for *non-critical waterways*. [Link to .xlsx, Link to GIS]

Discontinuation/Relocation Change Candidates – Low DRF1 Scores - Non-Critical Waterways

Shallow Water Aids - AAC III - DRF1 Cat 5 - WCG-5 [NN] Only (5215)

Datum	Total Aids	Subset of DRF1 < 25	Subset of Floating < 25	Subset of Fixed < 25	Total of DRF1 < 15	Subset of Floating < 15	Subset of Fixed < 15
0ft or Greater, < than 6ft	3120	2759	567	2192	1431	317	1114
6ft or Greater, < than 8ft	461	429	318	111	254	198	56
8ft or Greater	1630	1458	1155	303	795	643	152

*Note: Data of four (4) aids included in this set have negative datums and are therefore not included in the table.

Shaded first row aids, those with DRF1 scores less than 15 and datum less than six feet, most probably servicing problematic are priority candidates for discontinuation or relocation as they represent opportunities to realize efficiencies/servicing challenge relief.

Shaded second row aids datum greater than or equal to six feet and less than eight feet, possibly servicing problematic may be priority candidates for discontinuation for the same reasons.

Shaded third row aids are candidates for discontinuation or relocation.

All discontinuation decisions subject to recommended change limits at track keeping segment [NMT 34%] and waterway levels [NMT 20%] and recommended revised Shallow Water track keeping segment design criteria.

The below table shows relocation candidates for low DRF1 Score aids in WAMS Criticality Groups [2-CEN], [3-CE], and [4-CN].

Change Candidates - Relocations Only – Low DRF1 Scores - Critical Waterways [\[Link to .xlsx\]](#), [\[Link to GIS\]](#)

Shallow Water Aids - AAC III DRF1 Cat 5 - WCG 2-4 [CM, CEN, CE, CN] (7242)							
Datum	Total Aids	Subset of DRF1 < 25	Subset of Floating < 25	Subset of Fixed < 25	Total of DRF1 < 15	Subset of Floating < 15	Subset of Fixed < 15
0ft or Greater, < than 6ft	5016	4094	435	3659	1738	210	1528
6ft or Greater, < than 8ft	453	368	188	180	135	73	62
8ft or Greater	1768	1287	644	643	465	238	227

*Note: Data of five (5) aids included in this set have negative datums and are therefore not included in the table.

NAV-3 completed Phases of the Risk Management cycle through Develop Alternatives [change candidate identification] completed and socialized through Coast Guard internal processes and stakeholder outreach.

In the Decide and Implement Stage, operational commanders will make decisions on identified change candidates in NAV-3 facilitated workshops. Operational commanders will develop implementation plans. NAV will review and approve implementation plans.

In the Monitor and Evaluate Stage, operational commanders will implement approved plans, monitor and evaluate impacts, adapting based on observed results.

These last two stages are detailed at Appendix C - Workshop Plans.

The process will be systematically revisited when rigorous, quantitative, risk-based design tools become available.

Attachment 1 – LOSS Charter

United States Coast Guard

Commandant
United States Coast Guard

2703 Martin Luther King Jr. Ave SE Washington, DC 20593-7618
Staff Symbol: CG-DCO-D Phone: (202) 372-3501

16500
9 June 2015

Reply to CG-NAV Attn of: CDR Stone

MEMORANDUM

From:  Gary C. Rasicot
COMDT (CG-5PW)

To: Distribution

Subj: LEVEL OF SERVICE DEVELOPMENT WORKING GROUP CHARTER

Ref: (a) 5PW Memo 16500 of 24 Feb 2014

- (a) **Background:** Our waterways have undergone significant changes in the last thirty years and more are anticipated. Traffic has become more congested and users have become more diverse. The size of the ships calling on U.S. ports has increased without an appreciable increase in the navigation corridors in and out of our ports. Most channels have not widened despite an increase of the beams on our vessels. Bridge clearances have not become greater. The expansion of petroleum based shipments has increased the amount of hazardous cargo moving on our waterways. We must focus our efforts within the nation's Maritime Services Portfolio on increasing the mariners' situational awareness.
- (b) **Purpose:** To address these changes and bring the economic engine that is America's waterways into the 21st century, I will leverage the ATON Modernization and Optimization Steering Committee and create a working group to focus on defining and refining Coast Guard ATON levels of service to better enhance mariner situational awareness and improve the efficiency of America's waterways.

We will leverage technology, where possible and practical, and we will right size and modernize our physical aids to navigation system to be more efficient. The Deputy Commandant for Mission Support has already taken steps to centralize our ATON logistics management to more effectively use the resources available with the stand up of a Waterway Operations Product Line. In addition, we will look at technological advances on buoy construction and mooring solutions to improve our servicing concept of operations.

Discussion: The current aids to navigation design framework needs to be updated to take into account technology advances that allow for better navigation positioning and increased marine safety information. Therefore, the Coast Guard will review the national levels of service provided to the mariner by the U.S. Aids to Navigation System (USATONS). To determine the appropriate aids to navigation lay down, we must take a systematic and holistic approach that considers stakeholder input, environmental considerations, channel framework, user capabilities, training and carriage, available technology, and available resources. By leveraging our current WAMS process, CG-NAV will lead the necessary analyses to build our Level of Service framework. Ultimately, these Levels of Service will define where and how the Coast Guard will provide aids to navigation to meet today's requirements throughout the U.S. Marine Transportation System. The first system that will be reviewed is the East Coast Seacoast System.

Seacoast waterways are unrestricted systems without specific boundaries or controlling depth, and are typically transited by vessels making landfall from an ocean or sea voyage or by those transiting along the coast. ATON in these unrestricted waterways are generally used for geographic reference or to mark specific hazards to navigation. A portion of the Seacoast ATONS were established based on mariner requirements that predate modern navigation technologies and methods. As a result, many of the existing ATONS are no longer used in the way they were originally intended or in a fashion adhering to the primary objective of the USATONS.

(c) Membership:

Name	Office	Responsibility
CDR John Stone	CG-NAV	Team lead
R. David Lewald	CG-NAV	WAMS Coordinator
LT Ben Earling	CG-NAV	Member
Andrew Haley	CG-NAV	Member
TBD	CGNAVCEN	Member
TBD	LANT 54	Member
Jack McLaughlin	DI (dpw)	Member
TBD	D5 (dpw)	Member
TBD	D7 (dpw)	Member
TBD	D8 (dpw)	Member
George Detweiler	CG-NAV	Reviewer
LCDR Trevor Parra	CG-WWM	Reviewer

(d) Deliverables: The ATON Levels of Service Analysis Working Group will provide a written report to the ATON Modernization and Optimization Steering Committee. The report will include, but not limited to:

- a. A list of waterways affected;
- b. Number and type of ATON Units;
- c. Number of aids to navigation by type;

- d. An outline of outreach conducted;
- e. A list of users types considered;
- f. A list of environmental concerns;
- g. A list of Marine Spatial Planning implications;
- h. Policy guidance recommendations to modernize the physical ATON System.

The Working Group is expected to deliver a consolidated WAMS analysis for the Atlantic Seacoast System no later than 31 August 2015.

- 6. I will provide follow on guidance for analyses of the Pacific Coast Seacoast System, USATONS Deep Water Systems, USATONS Shallow water systems, Western Rivers Open Water Systems, and Western Rivers Pooled Water Systems.

#

Dist: CG-4, CG43, CG-092, CG-NAY, CG-WWM, LANT(54), PAC(54), D1(dpw), D5(dpw), D7(dpw), D8(dpw), D9(dpw), D11(dpw), D13(dpw), D14(dpw), D17(dpw), CG SILC, CG NAVCEN, CEU Miami

-
- c. Part I value for each aid shall be reviewed at each servicing interval. This review is to ensure that the Part I is updated in the event of changes in waterway or aid function considerations for the aid.
- d. How to use the Discrepancy Response Factor Decision Guide:
Part I - In sections A and B, determine the correct response to each question. Then circle the X directly to the right of that response. Add up the number of X's in each column, multiply by the weighting factor provided for the column, and fill in the blank. Add the sum of the products from each column and enter the total for Part I in the box.
Part II- This part can be completed only after the discrepancy has occurred. Complete Part II for the appropriate aid in the same manner as Part I.
Discrepancy Response Factor - Multiply the Part I total by the Part II total. This product is the DRF.
Discrepancy Response Level - Place the DRF in the appropriate numerical range (see pg 9-3) and assign a discrepancy response level. Initiate necessary action.
- e. The value derived from the completion of Part I will place each aid into one of the following categories:
- CATEGORY 1 Above 50
 - CATEGORY 2 46 - 50
 - CATEGORY 3 41 - 45
 - CATEGORY 4 36 - 40
 - CATEGORY 5 Below 36
- These categories will enable easy identification of the importance of an aid as well as providing a tool for facilities management. The importance of an aid might also be useful in unusual circumstances, i.e. ice season, assessing storm damage, etc.

Attachment 3 – Waterway Criticalities

- **During the WAMS process waterways are assessed and categorized per paragraph 3.C.1.a(5). Critical waterways are those in which a degradation of the ATON system would present an unacceptable level of risk from a Military, Environmental, or Navigational standpoint. This information is entered into I-ATONIS by filling in the appropriate criticality flag(s) for that WAMS segment. A WAMS criticality group value (1 – 5) is then automatically assigned to that portion of waterway represented in the WAMS segment using the following order of precedence:**
 - **CM: Critical Military, Environmental, and Navigation (CMEN), Critical Military and Environmental (CME), Critical Military and Navigation (CMN), or Critical Military (CM).**

 - (2) CEN: Critical Environmental Navigation (CEN)**

 - (3) CE: Critical Environmental (CE)**

 - (4) CN: Critical Navigation (CN)**

 - (5) NN: Non-Critical (NN)**

Attachment 4 – Aid Availability Categories

E. Aid Availability.

- (e) **Definition.** Aid Availability is the probability that an aid to navigation or system is performing its specified function at any random chosen time. Basically, aid availability is a measure of the health of an aids to navigation system in a given waterway. It is not a measure of unit, sector, or district effectiveness.
- (f) **Aid Availability Categories.** Waterways have a variety of traffic patterns and risk levels. Therefore, aid availability objectives for each aid to navigation or system is categorized according to their level of criticality. All Coast Guard maintained aids to navigation are assigned to one of the following aid availability categories:
- **Category 1: An Aid to Navigation (ATON) or system of ATON that is considered by the Coast Guard to be of vital navigational significance.**
 - **Category 2: An ATON or system of ATON that is considered by the Coast Guard to be of important navigational significance.**
 - **Category 3: An ATON or system of ATON that is considered by the Coast Guard to be of necessary navigational significance.**

CH-1

3-18

- i. **Aid Availability Category Determining Factors.** The aid availability category for a particular aid to navigation is determined from information derived from Part I of the Discrepancy Response Factor Decision Guide (DRF1) for the aid and the WAMS criticality category of its associated waterway.
- **As described in Chapter 9, the value derived from the completed DRF1 form places an aid to navigation into one of five categories numbered 1 - 5. The DRF1 form is completed in I-ATONIS, which automatically assigns the Part I category for the aid.**
 - **During the WAMS process waterways are assessed and categorized per paragraph 3.C.1.a(5). Critical waterways are those in which a degradation of the ATON system would present an unacceptable level of risk from a Military, Environmental, or Navigational standpoint. This information is entered into I-ATONIS by filling in the appropriate**

criticality flag(s) for that WAMS segment. A WAMS criticality group value (1 – 5) is then automatically assigned to that portion of waterway represented in the WAMS segment using the following order of precedence:

- **CM: Critical Military, Environmental, and Navigation (CMEN), Critical Military and Environmental (CME), Critical Military and Navigation (CMN), or Critical Military (CM).**
- (2) CEN: Critical Environmental Navigation (CEN)**
 - (3) CE: Critical Environmental (CE)**
 - (4) CN: Critical Navigation (CN)**
 - (5) NN: Non-Critical (NN)**

3-19

CH-1

4. **Calculating Aid Availability Categories.** Aid availability categories are automatically calculated in I-ATONIS by combining the values of Part I of the Discrepancy Response Factor Decision Guide (DRF1) and the WAMS Criticality Group. The following table provides the mechanics for calculating aid availability categories:

Aid Availability Categories

WAMS Criticality Group Value		DRF1 Value				
		1	2	3	4	5
1	CM	1	1	1	2	2
2	CEN	1	1	2	2	3
3	CE	1	2	2	3	3
4	CN	2	2	3	3	3
5	NN	2	3	3	3	3

5. **Aid Availability Objectives.** The aid availability objectives for each category are calculated over a period of three continuous years. The objective for each aid availability category is as follows:
- a. Category 1 99.8%
 - b. Category 2 99.0%
 - c. Category 3 97.0%

Appendix B – Outreach

This Appendix captures information on SWLOSS outreach activities. The study conducted a user survey, corresponded/met with commercial and recreational user stakeholders—AWO and BoatUS, and engaged interested parties in connection with Apalachicola-Chattahoochee-Flint Rivers issues. These outreach activities are summarized below, key documents attached.

Survey.

As part of the study outreach effort the Navigation Technology and Risk Management Division prepared a survey to capture information about Shallow Waterway users, their vessels, their practices, their navigation gear, their assessment of the current system, and suggestions for improvements.

See summary results at [Attachment 1](#).

Information and survey links were posted in Local Notices to Mariners and via Coast Guard Boating Safety partner network. See [Attachment 2](#) and [Attachment 3](#). The survey was conducted via Survey Monkey, with almost 10,000 users responded. Survey participation skewed recreational [Boating Safety outreach was effective.] Participation also skewed experienced. [Experienced stakeholders were motivated to respond.

The survey included two open-ended questions. Question 15: What hazards to Navigation are you most concerned about when you operate in shallow waters? Question 22: In general, what could the Coast Guard do better to meet your needs in shallow waterways? See all survey results [here](#). Open ended question responses are at columns AN [Q15] and BF [Q22].

Key Findings:

- The survey showed extensive use of GPS and ECS/chart plotter.
- Experienced users were generally satisfied with ATON services provided. Improved discrepancy response and improved retro maintenance were common suggestions.
- Inexperienced users were less satisfied and asked for more aids, particularly more lighted aids.
- No one asked for fewer aids.

BoatUS.

On 1 March 2022, SWLOSS team personnel met with BoatUS and BoatUS Safety Foundation leadership at their Annapolis offices. Leadership included a sitting NBSAC member. The team described the study context, purpose, scope, review, policy statement, operational commander implementation process, previous studies. Encouraged communication/advocacy as considered appropriate. Discussed SWLOSS survey results with regard to recreational boater participation, experience splits, navigation equipment. [All BoatUS present active boaters, all using smartphone navigation apps.] BoatUS expressed concern that their less experienced members under-represented in survey. [Agreed.] Discussed prudent mariner concept in context of program guiding regulations, experience expectations in context of SRA design, considerations for vessels constrained to channel by draft, those not. Constructive engagement.

AWO.

SWLOSS corresponded with AWO. This outreach was fairly fresh on the heels of Western Rivers LOSS engagement. [\[AWO Response\]](#)

ACE.

Study Action Taken.

- March 2022. Made a site visit to Eufaula, Alabama on. D8 Waterways, CG-7 Boat Forces reps also participated.
 - Telling Anecdote. On arrival at hotel evening before day of scheduled events, encountered a proud owner of a high end, high horsepower bass boat, who caught this stranger admiring. No business introductions, just a stranger admiring a fine boat. He and his family, visiting from the Canaveral area, had just returned from a successful fishing day on lake. After conversation around his catch and his 70-knot speed, asked if there were any aids to navigation on the lake. He replied to effect, not that he had noticed/used, but quickly volunteered to show his combination fish finder-GPS-chart plotter with upgraded commercial custom chart chip—also that he had just earned his six-pack license and was running some offshore charters at home. He introduced his wife, children, and dog. We wished each other a good evening and went our separate ways. Proved representative.
 - Met with acting OIC, crew. Talked issues. Walked property/facilities. Took a TANB ride on upper Lake. The lake is wide and deep. ATON mark a VERY wide “nine-foot channel.” Lake depths are generally well maintained, greatest depth around 70 feet.
 - Participated in a planned for occasion, development team hosted, meeting at City Hall. Mayor, local officials, Congressional staffers from concerned AL, GA, FL delegations, local USACE officials, Coast Guard delegation participated in person, with a wide variety of additional stakeholders by VTC, including senior USACE Mobile District officials, river adjacent Nuclear Power Plant management, the Apalachicola River Keeper, and others. USACE was very direct regarding no plans to invest further. USACE shared that the Mobile District had submitted ACF plans in response to request for inputs to the administration’s massive infrastructure re-investment initiative, and that those plans had come nowhere close to making the cut, even under the extraordinary, opportunity rich circumstances. Shared that the Corps investment algorithms are all about commercial activity—and none here. Development minded stakeholders countered that sometimes investment must lead commercial activity—*build it and they will come*. Some softening of environmental positions, together with evidence of a credible business case from existing Eufaula based industry for barge commerce connecting to the Gulf of Mexico and ICW, put that argument in a slightly more promising light—at least for the pro-development minded, including some of the congressional staffers—of both parties.
- Participated in a WAMs related meeting attended mostly by development team members, some of whom own/operate bass boats, a few friends of, Coast Guard and USACE delegations, and a few others. WAMS survey responses were very few and none making compelling case for ATON. [Documents at Appendix B – Outreach]
- Flew the system, with OIC and D8 rep, at about 500 feet, observing waterway from open cargo door, Eufaula to the Gulf and return, courtesy of ATC Mobile and C-144 crew.

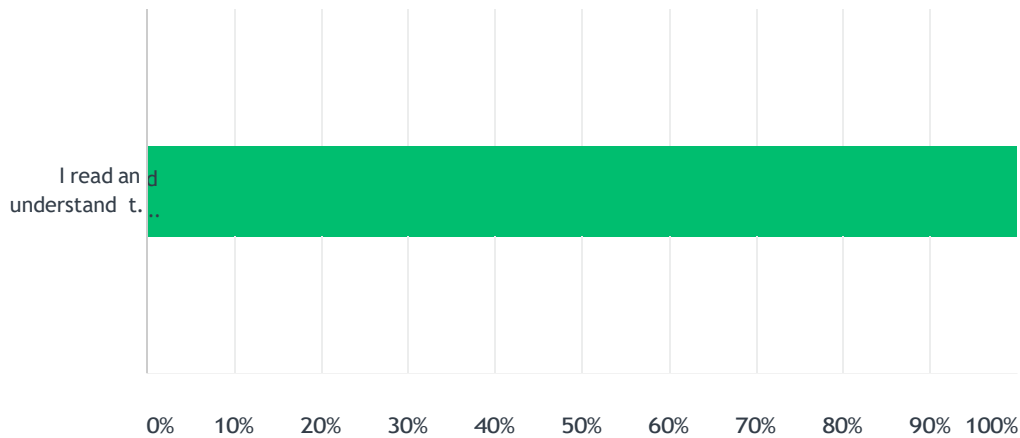
Finding. Ample evidence of moderate recreational bass boat use, almost exclusively on the pooled waters, peaking with a few annual tournaments. No waterway users needing or using existing ATON for navigation. Sector Mobile WAMS found same. Developers do not disagree. They are candid that their concern is that disestablishing the ANT EUFAUA/withdrawing CG ATON are moves in the wrong direction as they see it, in an already bleak-enough situation.

See ACF Waterway Development Associates Documents [[Attachment 4](#)] [[Attachment 5](#)].

Attachment 1 – Survey Summary Results

Q1 Shallow Water Waterways Analysis and Management System Study Privacy Notice Authority: 14 U.S.C. § 93, Commandant; general powers; 33 U.S.C. §§ 1223 and 1228; and 46 U.S.C. §§ 700 and 3717 Purpose: To collect data that will be used to advise the Coast Guard in the review and update of national Aids to Navigation (ATON) level of service policy, resulting in better understanding of current mariner navigational needs and capabilities, which will inform the Coast Guard’s management of the U.S. ATON system. In order to assist with maintaining confidentiality, respondents are advised not to include any personally identifiable information not requested in their responses. Routine Uses: This survey solicits information that the Coast Guard will use to validate the provision of required services to the mariner, and also foster enhanced workforce efficiency for the Coast Guard as it transforms U.S. waterways into a physical and information-based system. DHS/USCG-013, Marine Information for Safety and Law Enforcement (MISLE), June 25, 2009, 74 FR 30305 provides coverage for this collection. Disclosure: Furnishing this information is strictly voluntary.

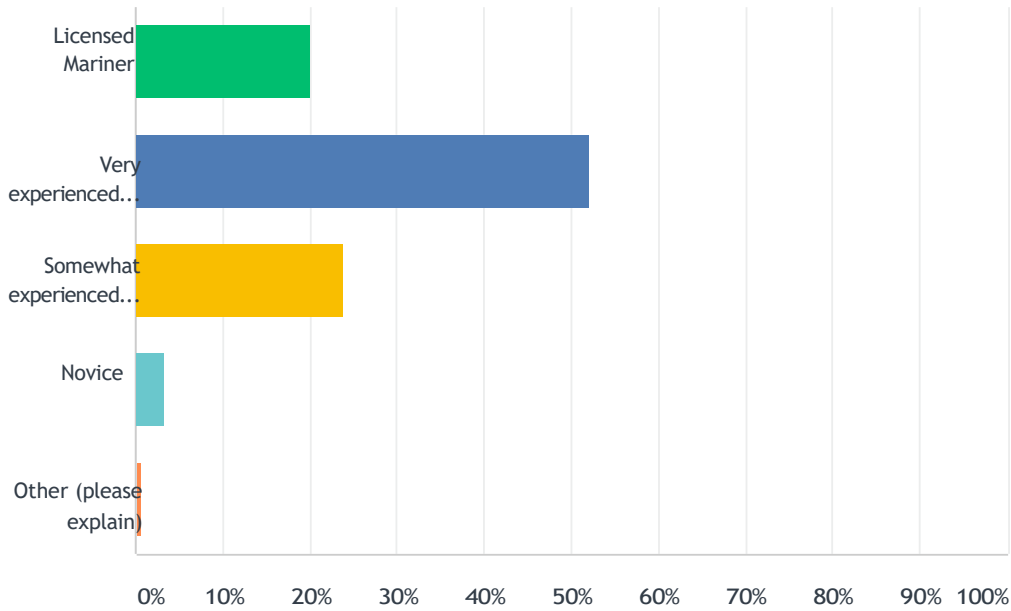
Answered: 4,214 Skipped: 5,256



ANSWER CHOICES	RESPONSES
I read and understand the privacy notice (check box to continue)	100.00% 4,214
Total Respondents: 4,214	

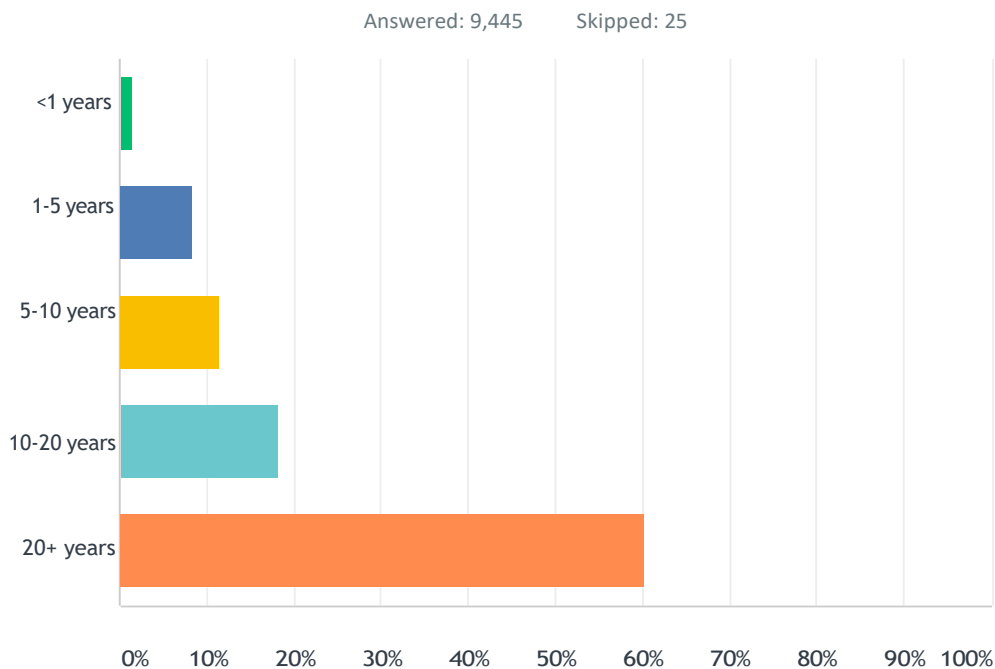
Q2 What do you consider your level of expertise?

Answered: 9,449 Skipped: 21



ANSWER CHOICES	RESPONSES	
Licensed Mariner	19.99%	1,889
Very experienced user	52.15%	4,928
Somewhat experienced user	23.86%	2,255
Novice	3.45%	326
Other (please explain)	0.54%	51
TOTAL		9,449

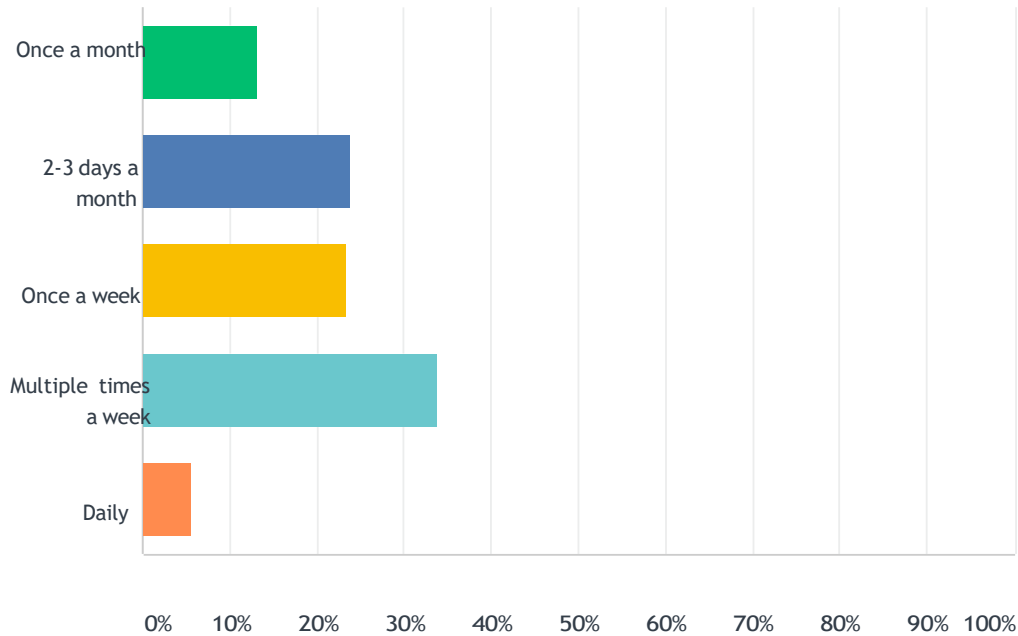
Q3 How many years have you been operating in shallow waterways? (<12ft)



ANSWER CHOICES	RESPONSES	
<1 years	1.57%	148
1-5 years	8.45%	798
5-10 years	11.46%	1,082
10-20 years	18.30%	1,728
20+ years	60.23%	5,689
TOTAL		9,445

Q4 How often do you operate in waters less than 12 feet?

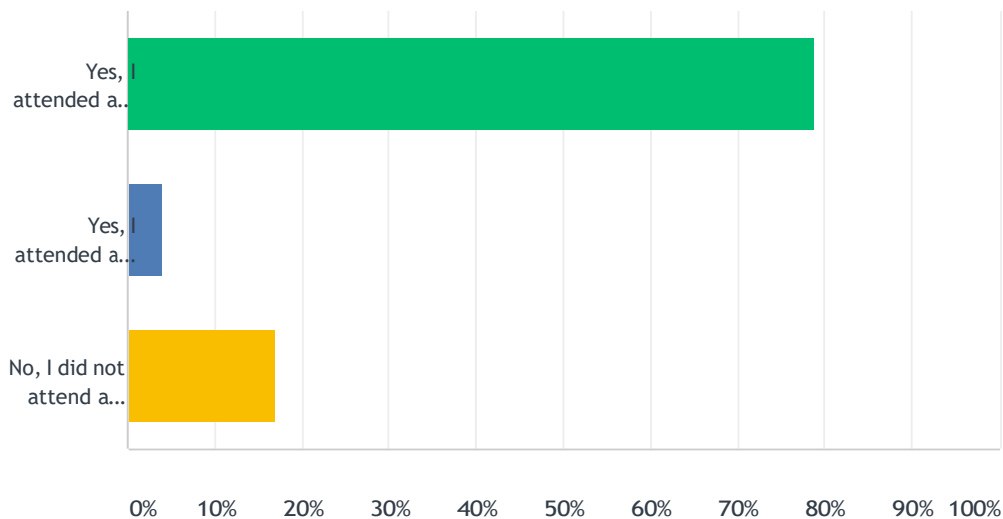
Answered: 9,433 Skipped: 37



ANSWER CHOICES	RESPONSES	
Once a month	13.10%	1,236
2-3 days a month	23.88%	2,253
Once a week	23.36%	2,204
Multiple times a week	33.93%	3,201
Daily	5.71%	539
TOTAL		9,433

Q5 Have you completed a Boating Safety or Navigation course and did it discuss Aids to Navigation (ATON)?

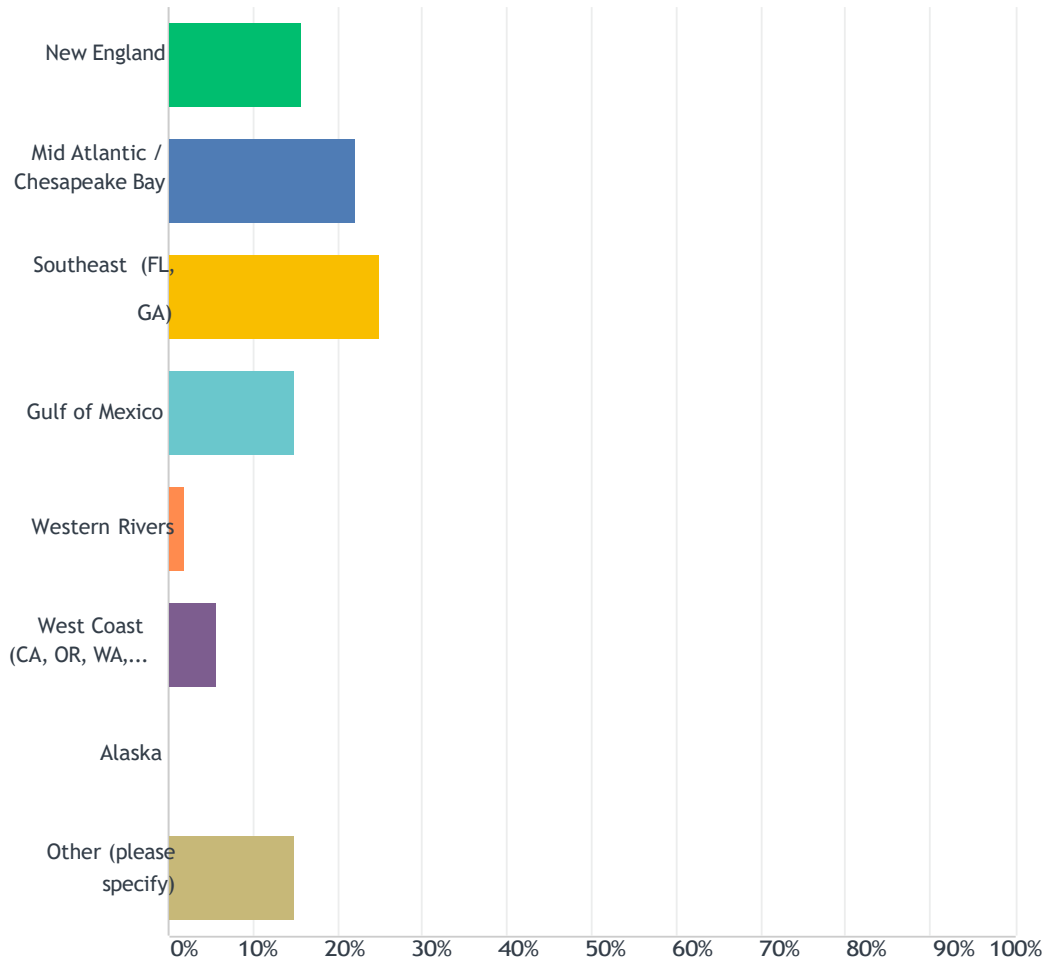
Answered: 9,440 Skipped: 30



ANSWER CHOICES	RESPONSES	
Yes, I attended a course; Yes, it covered Aids to Navigation	78.90%	7,448
Yes, I attended a course; No, it did not cover Aids to Navigation	4.06%	383
No, I did not attend a boating safety or navigation course	17.04%	1,609
TOTAL		9,440

Q6 What is the primary area you operate in?

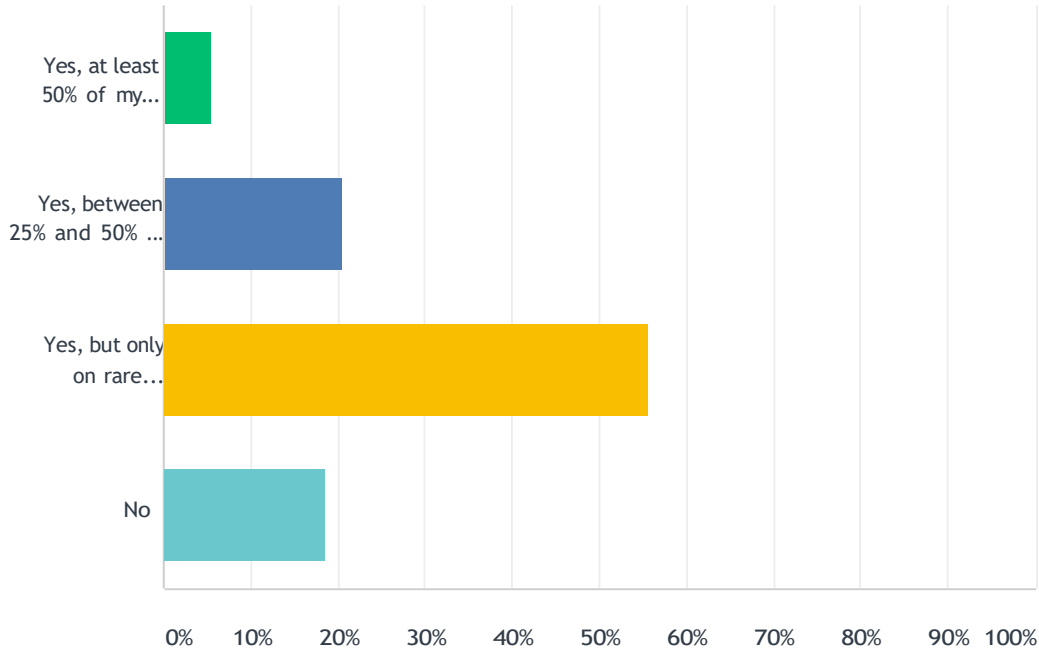
Answered: 9,446 Skipped: 24



ANSWER CHOICES	RESPONSES	
New England	15.77%	1,490
Mid Atlantic / Chesapeake Bay	22.19%	2,096
Southeast (FL, GA)	24.93%	2,355
Gulf of Mexico	14.78%	1,396
Western Rivers	1.84%	174
West Coast (CA, OR, WA, ID)	5.57%	526
Alaska	0.12%	11
Other (please specify)	14.80%	1,398
TOTAL		9,446

Q7 Do you engage in night time transits of shallow waterways?

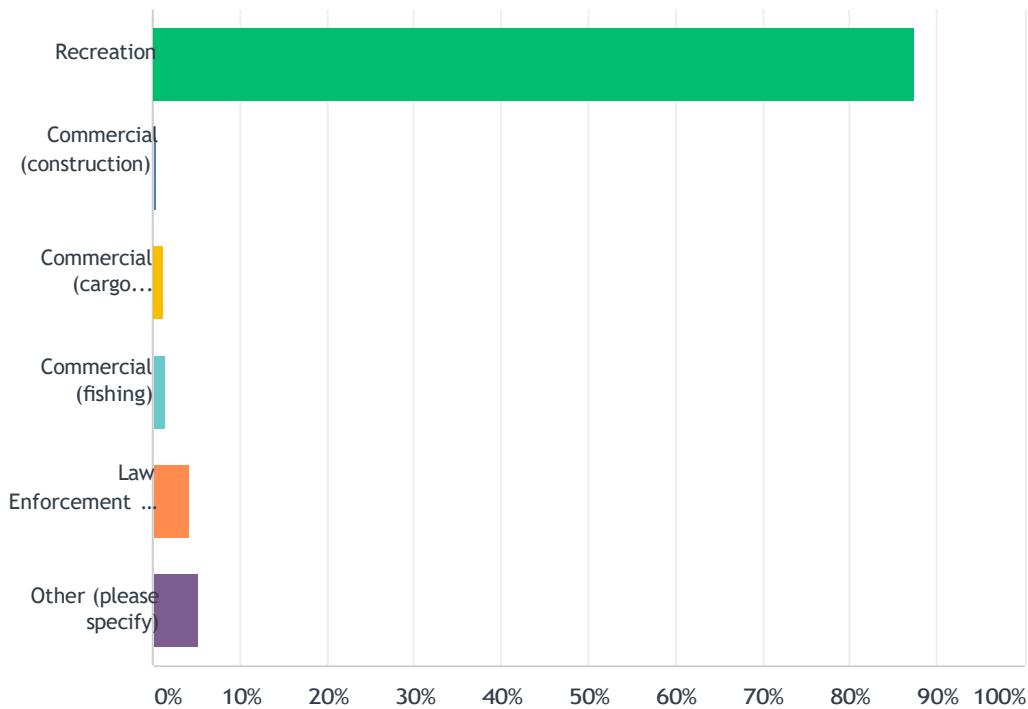
Answered: 9,434 Skipped: 36



ANSWER CHOICES	RESPONSES	
Yes, at least 50% of my voyages involve nighttime transit	5.34%	504
Yes, between 25% and 50% of my voyages involve nighttime transit	20.40%	1,925
Yes, but only on rare occasions.	55.73%	5,258
No	18.52%	1,747
TOTAL		9,434

Q8 When you operate in these areas, what is the nature of the trip?

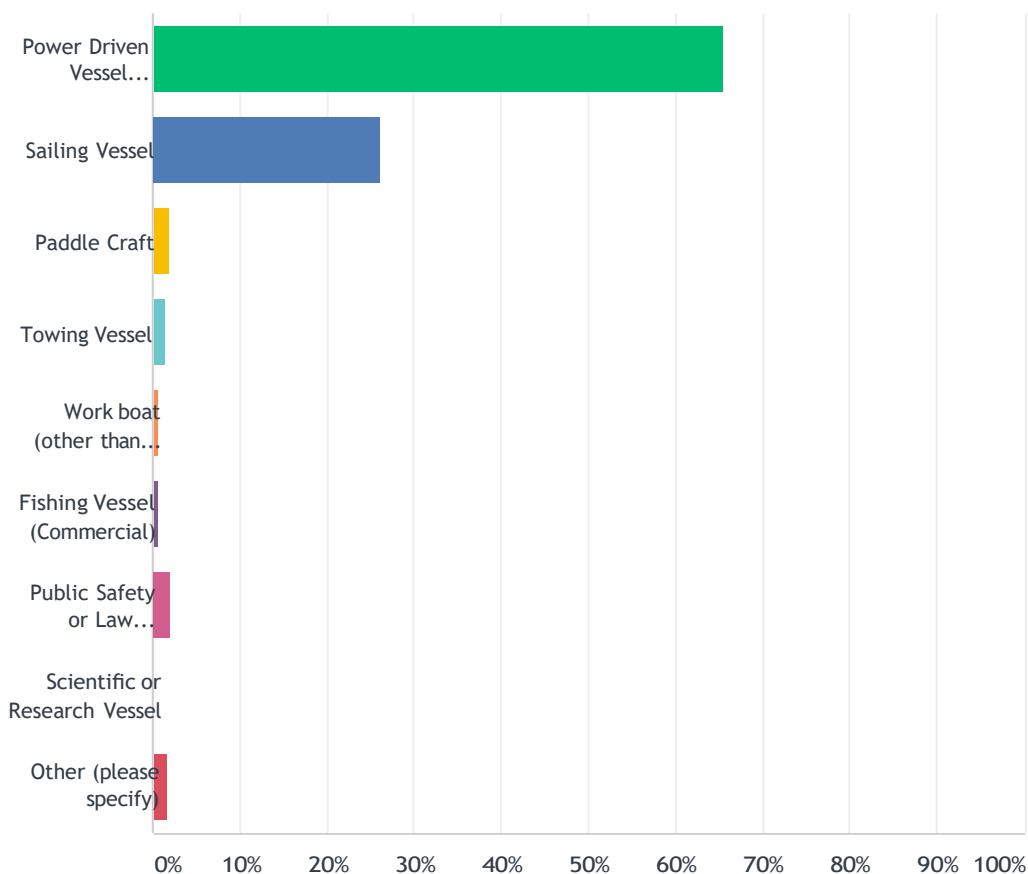
Answered: 9,438 Skipped: 32



ANSWER CHOICES	RESPONSES	
Recreation	87.54%	8,262
Commercial (construction)	0.40%	38
Commercial (cargo transport)	1.27%	120
Commercial (fishing)	1.43%	135
Law Enforcement / Public Safety	4.09%	386
Other (please specify)	5.27%	497
TOTAL		9,438

Q9 What type of vessel do you operate in waters of less than 12 feet?

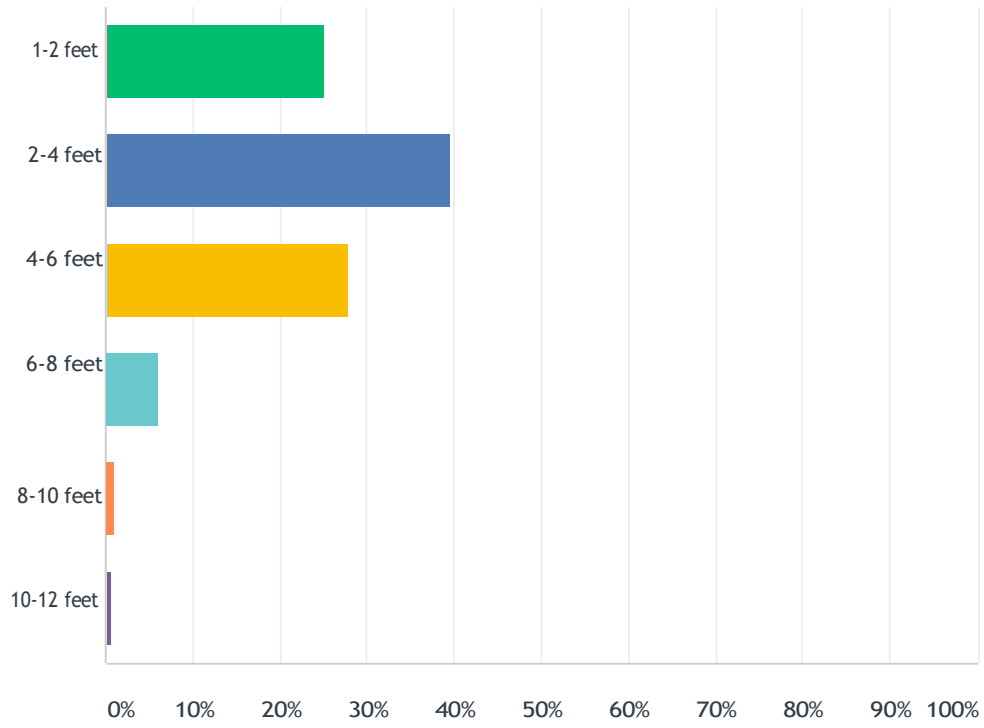
Answered: 9,447 Skipped: 23



ANSWER CHOICES	RESPONSES	
Power Driven Vessel (Motorboat)	65.50%	6,188
Sailing Vessel	26.07%	2,463
Paddle Craft	1.82%	172
Towing Vessel	1.51%	143
Work boat (other than towing vessel)	0.60%	57
Fishing Vessel (Commercial)	0.70%	66
Public Safety or Law Enforcement	2.00%	189
Scientific or Research Vessel	0.19%	18
Other (please specify)	1.60%	151
TOTAL		9,447

Q10 How deep is your vessel's draft?

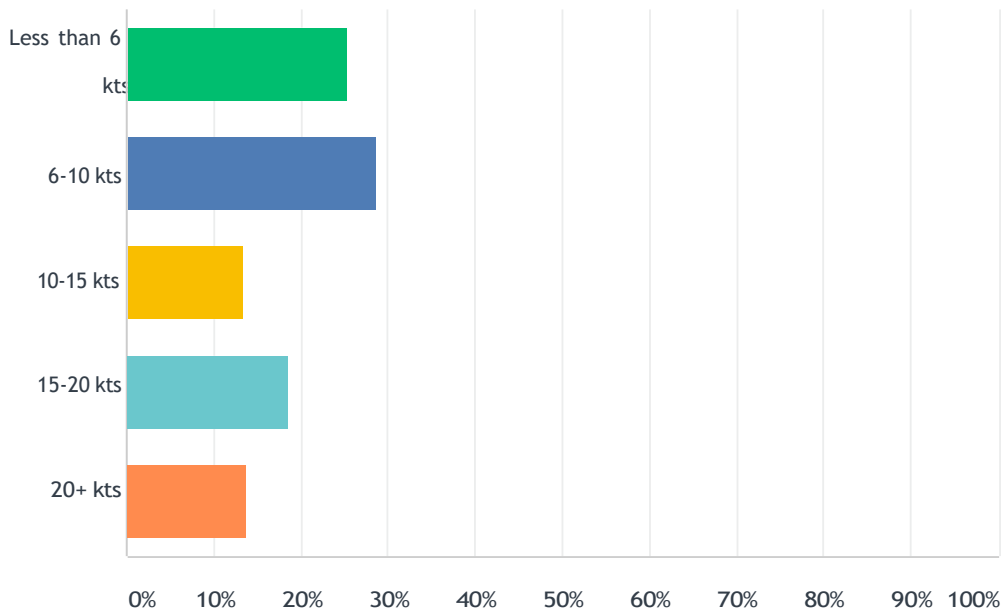
Answered: 9,438 Skipped: 32



ANSWER CHOICES	RESPONSES	
1-2 feet	25.10%	2,369
2-4 feet	39.57%	3,735
4-6 feet	27.88%	2,631
6-8 feet	5.97%	563
8-10 feet	0.94%	89
10-12 feet	0.54%	51
TOTAL		9,438

Q11 At what speed do you usually operate your vessel?

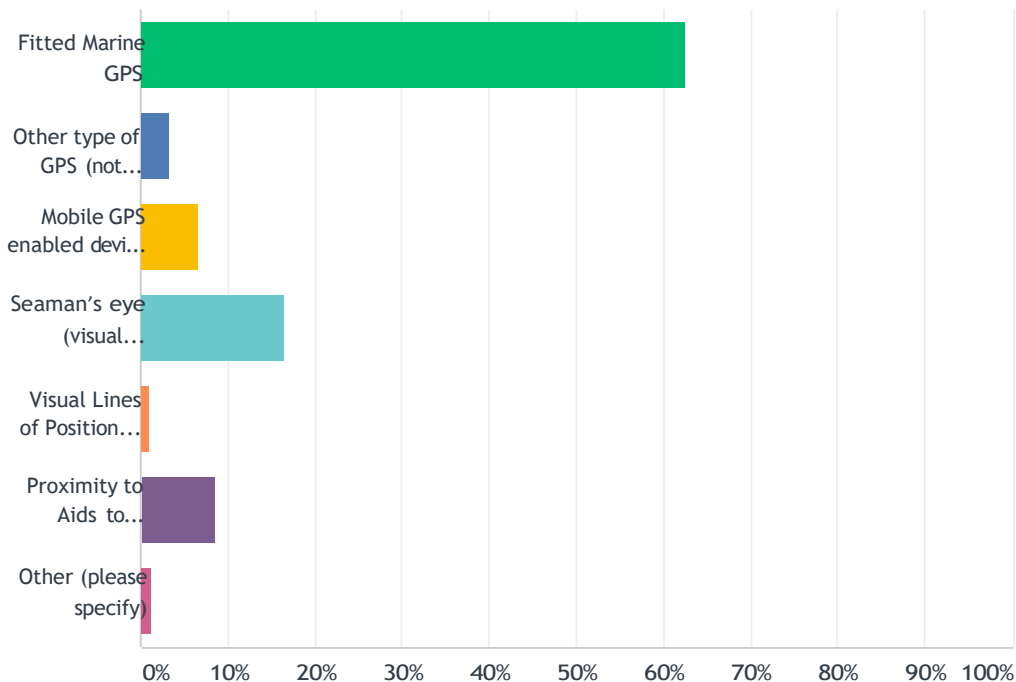
Answered: 9,435 Skipped: 35



ANSWER CHOICES	RESPONSES	
Less than 6 kts	25.38%	2,395
6-10 kts	28.63%	2,701
10-15 kts	13.38%	1,262
15-20 kts	18.72%	1,766
20+ kts	13.90%	1,311
TOTAL		9,435

Q12 What is your primary positioning source?

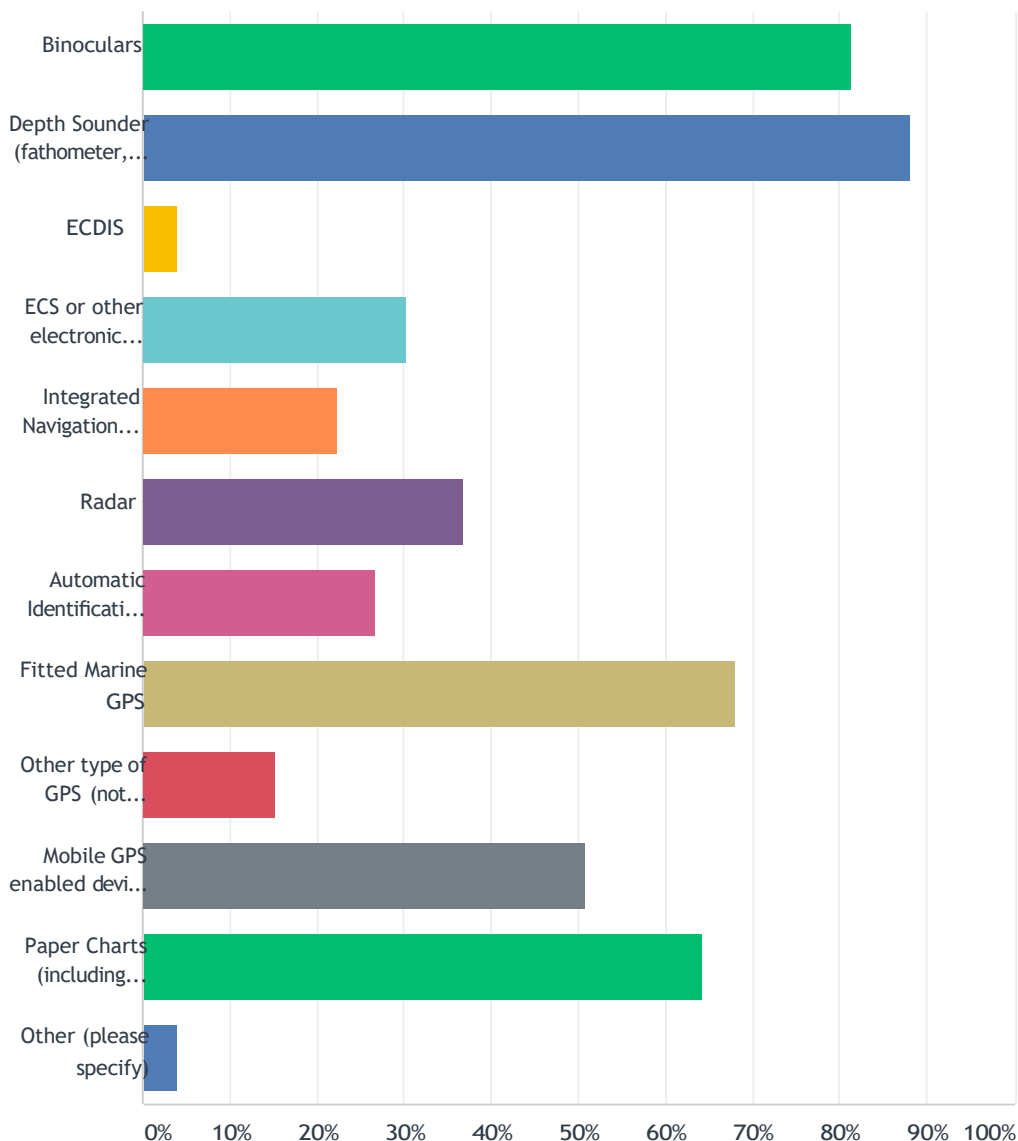
Answered: 9,447 Skipped: 23



ANSWER CHOICES	RESPONSES	
Fitted Marine GPS	62.55%	5,909
Other type of GPS (not including cell phone or tablet)	3.45%	326
Mobile GPS enabled device (Cell Phone or Tablet)	6.59%	623
Seaman's eye (visual references and local knowledge)	16.52%	1,561
Visual Lines of Position (plotted on a chart)	1.08%	102
Proximity to Aids to Navigation (buoys and beacons)	8.57%	810
Other (please specify)	1.23%	116
TOTAL		9,447

Q13 What navigational equipment do you have onboard? Please check all that apply.

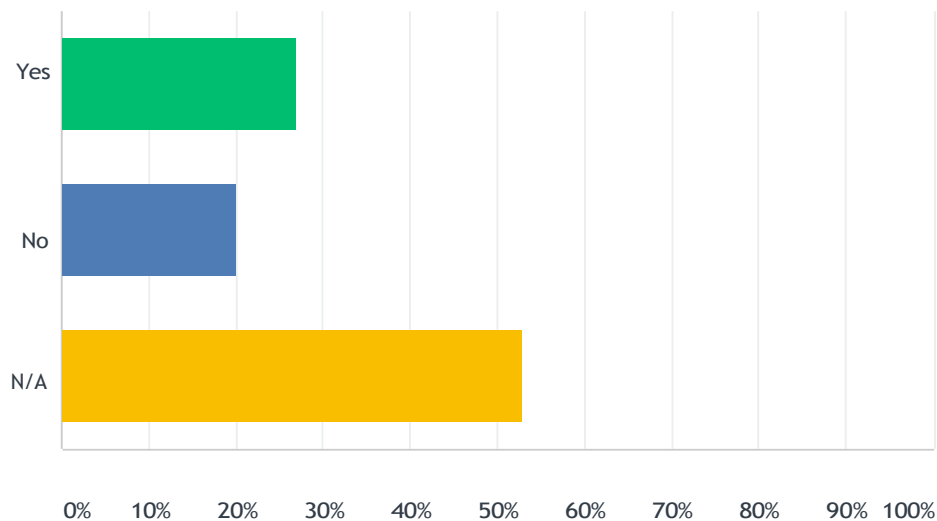
Answered: 9,439 Skipped: 31



ANSWER CHOICES	RESPONSES	
Binoculars	81.31%	7,675
Depth Sounder (fathometer, fish finder)	88.11%	8,317
ECDIS	4.04%	381
ECS or other electronic chart plotter	30.41%	2,870
Integrated Navigation System	22.42%	2,116
Radar	36.85%	3,478
Automatic Identification System (AIS)	26.84%	2,533
Fitted Marine GPS	67.94%	6,413
Other type of GPS (not including cell phone or tablet)	15.22%	1,437
Mobile GPS enabled device (Cell Phone or Tablet)	50.79%	4,794
Paper Charts (including chart books)	64.25%	6,065
Other (please specify)	3.88%	366
Total Respondents: 9,439		

Q14 If your vessel is equipped with AIS, can you display AIS information on an external device such as a RADAR or Electronic Charting System?

Answered: 9,400 Skipped: 70



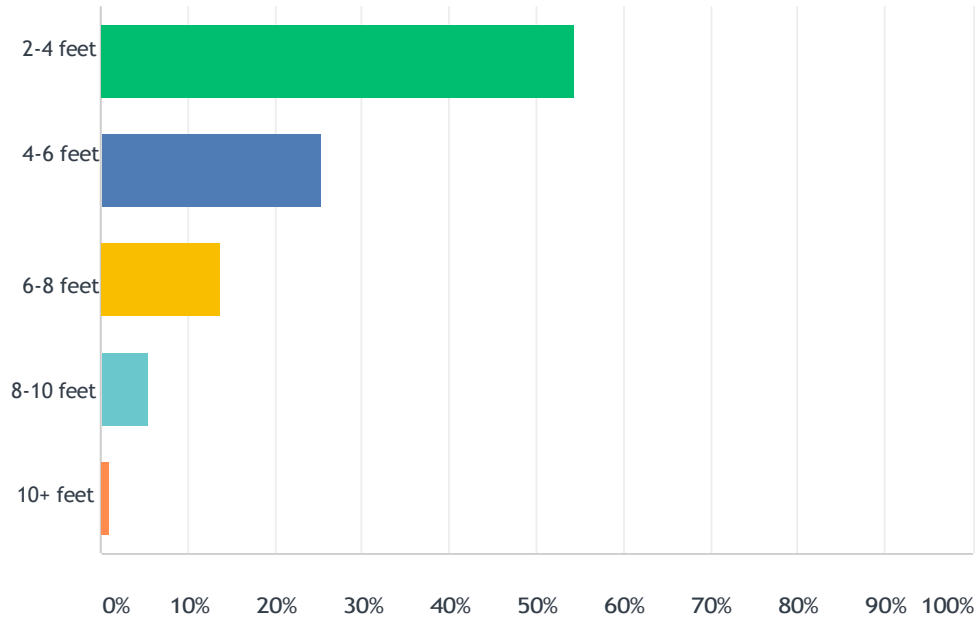
ANSWER CHOICES	RESPONSES	
Yes	26.99%	2,537
No	20.06%	1,886
N/A	52.95%	4,977
TOTAL		9,400

Q15 What hazards to navigation are you most concerned about when operating in shallow water?

Answered: 9,015 Skipped: 455

Q16 What is the depth of water that you determine to be too shallow to enter?

Answered: 9,230 Skipped: 240

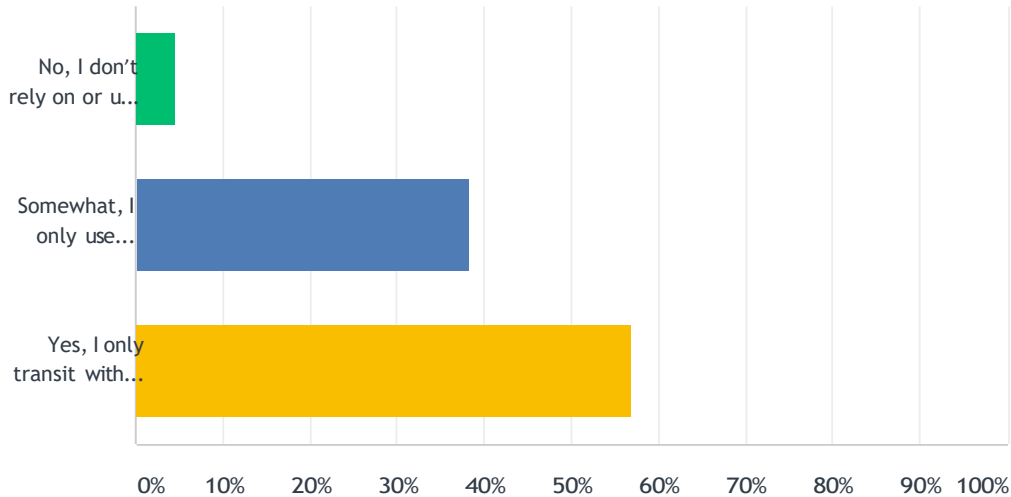


ANSWER CHOICES	RESPONSES	
2-4 feet	54.50%	5,030
4-6 feet	25.28%	2,333
6-8 feet	13.87%	1,280
8-10 feet	5.42%	500
10+ feet	0.94%	87
TOTAL		9,230

Q17 Do you rely on physical aids to navigation (buoys and beacons) when navigating in shallow water? (This question is designed to understand how mariners use federal aids, not to assess seamanship or navigation skills.

Please choose the answer which most honestly reflects your situation.)

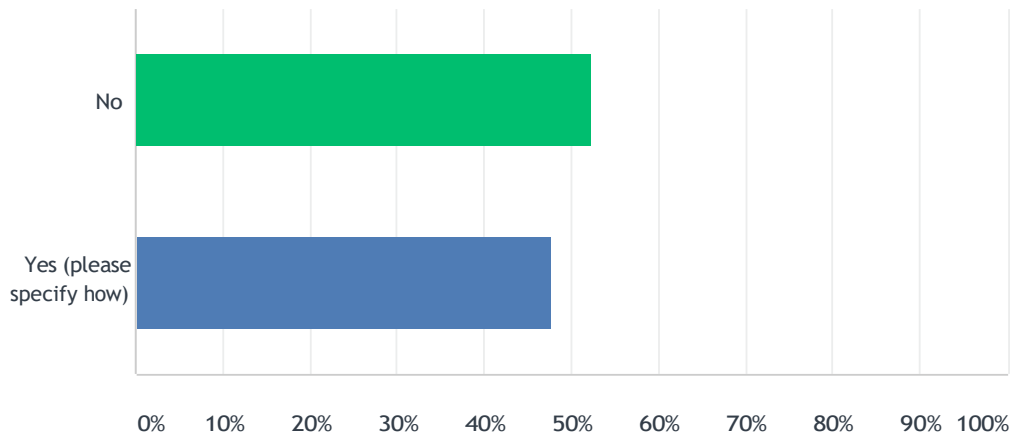
Answered: 9,413 Skipped: 57



ANSWER CHOICES	RESPONSES
No, I don't rely on or use physical aids to navigation in shallow water	4.62% 435
Somewhat, I only use physical aids to navigation as reference to where I am at geographically, not to determine safe Water	38.37% 3,612
Yes, I only transit within the designated channels marked by the physical aids to navigation	57.01% 5,366
TOTAL	9,413

Q18 Does depth of water impact whether or not you rely on physical aids to navigation?

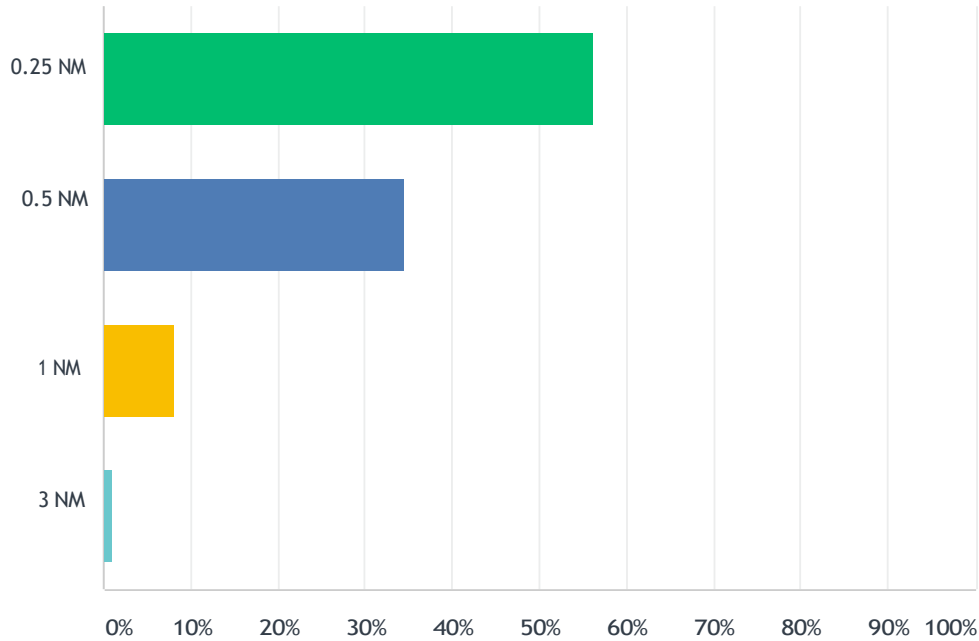
Answered: 9,422 Skipped: 48



ANSWER CHOICES	RESPONSES	
No	52.21%	4,919
Yes (please specify how)	47.79%	4,503
TOTAL		9,422

Q19 At what distance do you need to be visually notified of shoal water or other hazards of the waterway?

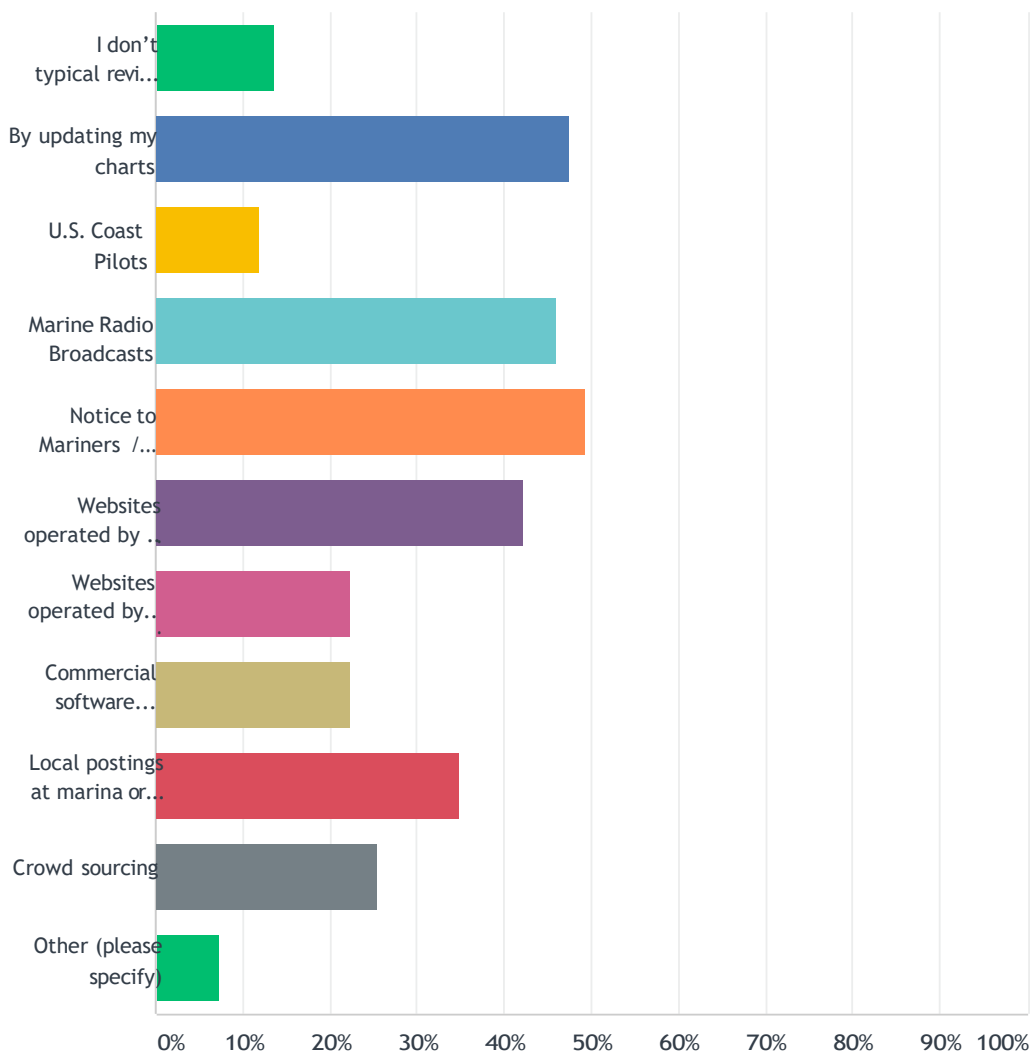
Answered: 9,378 Skipped: 92



ANSWER CHOICES	RESPONSES
0.25 NM	56.20% 5,270
0.5 NM	34.55% 3,240
1 NM	8.16% 765
3 NM	1.10% 103
TOTAL	9,378

Q20 How do you obtain navigation and Marine Safety Information for the waterway(s) you transit? Select all that apply. (This includes information published by the USCG or other Federal Agencies such as the Local Notice to Mariners, Broadcast Notice to Mariners, Notice to Mariners, or Notices to Navigational Interest – Examples: ATON discrepancies, proposed changes to the waterway, dredging projects, local events with safety and security zones, etc.)

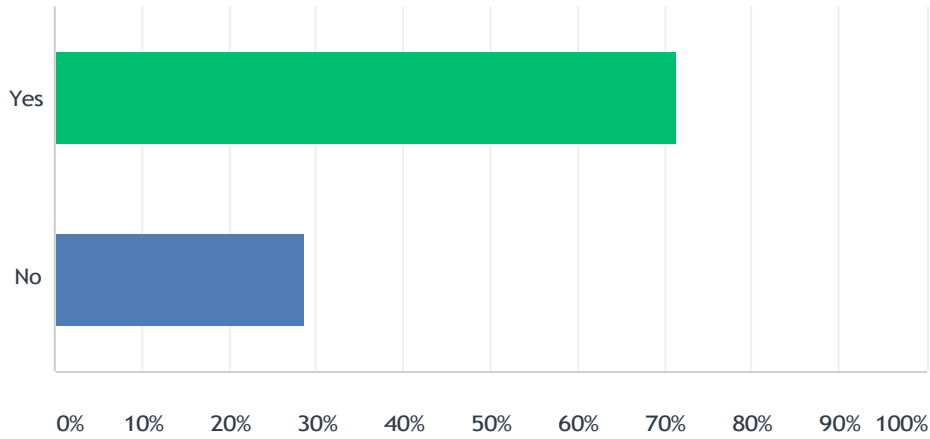
Answered: 9,439 Skipped: 31



ANSWER CHOICES	RESPONSES	
I don't typical review marine safety information	13.50%	1,274
By updating my charts	47.40%	4,474
U.S. Coast Pilots	11.93%	1,126
Marine Radio Broadcasts	45.98%	4,340
Notice to Mariners / Navigation	49.32%	4,655
Websites operated by the CG, NOAA, NGA, or USACE	42.33%	3,996
Websites operated by other than government entities	22.35%	2,110
Commercial software application	22.45%	2,119
Local postings at marina or boat ramp	34.87%	3,291
Crowd sourcing	25.43%	2,400
Other (please specify)	7.26%	685
Total Respondents: 9,439		

Q21 Do the services provided by the USCG in shallow waterways adequately meet your needs?

Answered: 9,361 Skipped: 109



ANSWER CHOICES	RESPONSES	
Yes	71.32%	6,676
No	28.68%	2,685
TOTAL		9,361

Q22 In general, what could the Coast Guard do better to meet your needs in shallow waterways?

Answered: 7,087 Skipped: 2,383

Attachment 2 – Study Introduction Article

**Coast Guard Conducting Study
to Improve Nation’s Shallow Draft Waterways ATON System**

By: LCDR W. Christian Adams
USCG Office of Navigation Systems - Navigation Technology and Risk Management Division

The U.S. Coast Guard is conducting an assessment of the Shallow Draft Waterway Systems, the fourth in a series of studies to determine the navigation requirements for mariners in the U.S. Marine Transportation System (MTS). The Waterways Analysis and Management System (WAMS) study will help the Coast Guard to determine the Aids to Navigation (ATON) requirements in the Shallow Draft Waterway Systems which includes all navigable waterways of the United States less than 12 feet.

The nation’s shared use waterways have become increasingly congested and complex. While the number and size of the vessels traveling through the MTS has increased, the number and in some cases size of navigation corridors has not. The recreational boating industry has seen steady growth over the last decade increasing the number of users on the water. To address these changes and determine navigation requirements for the Shallow Draft Waterway System, the Coast Guard will consider feedback from users and national, regional, and local maritime partners and stakeholders that operate in navigable waters less than 12 ft.

The study is focused on providing consistent, program-wide policy necessary to support Coast Guard District Commanders in the execution and management of ATON services within the Shallow Draft Waterway System, present in all nine Coast Guard Districts. The findings and recommendations will not determine what individual ATON to add, keep, or remove, but they will shape policy for the next generation waterway system management and design. Due to rapid shoaling in America’s waterways, the Coast Guard is also hoping to be able to use this study to determine what the minimum depth should be to safely mark these waterways with ATON.

The assessment is part of the U.S. Coast Guard’s effort to make navigable waterways of the United States safer, more efficient, and resilient. Studies have been previously conducted of the Atlantic and Pacific Seacoast Systems along with the Western Rivers (Inland Waterways) System. Future studies are planned to include the Intracoastal Waterways and Deep Draft Waterway Systems. Each of these studies examines various factors to determine the optimal waterway design including waterway, vessel, and boat characteristics; waterway users; available technology and environmental considerations; waterway traffic, user data (where available) from Automatic Identification System (AIS) data sources; training and carriage requirements, available technology other than carriage; and ATON discrepancies. Data on recreational boating will be sought from users, local and state agencies.

Waterway users, interested parties, and stakeholders are invited to provide comments or feedback via the tool posted at <https://www.surveymonkey.com/r/ShallowWaterWAMS>. This link will remain available until November 1, 2020. Further questions or comments may be emailed to CGNAV@uscg.mil using the subject line: “Shallow Draft WAMS”.

Attachment 3 – Survey Introduction

U.S. Department of
Homeland Security
**United States
Coast Guard**



NATIONWIDE WAMS SHALLOW DRAFT SYSTEM

Purpose: The purpose of the Shallow Water WAMS is to advise the Office of Navigation Systems in the review and updating of existing ATON policy to provide guidance to the district ATON staff on the minimum level of Aids to Navigation service. This report will inform and provide recommendations to improve service that is provided the mariner navigating waters less than 12 feet deep.

Primary users: Vessels drawing less than 12 feet to include but not limited to, commercial tug/barge traffic, recreational, government users (police, DNR, USCG, etc.). Upon collection of data, we will determine what the primary vessel should be in waterway design projects in this category.

Timeline: The project will kick off in Aug 2020 and be completed approximately 16 months later.

Data Collection:

1. State boating registrations
2. AIS data (limited)
3. ATON Queries (lit/unlit, sound signals, lateral/danger/junction)
4. ATON discrepancies
5. Collisions, Allisions, and Grounding

User/feedback and outreach: The study will be formally kicked off via a public affairs guidance to the district, an entry in the Local Notice to Mariner, published article in professional magazines that focus on the user group, and interaction with various users by way of public organizations (BOAT USA, CG BSX, etc.) This will include public outreach via a user survey which will remain open for 4-6 months. User will be able to provide input electronically, or send a copy of their survey to me, for manual entry.

Questions hoping to be answered:

1. Who are the predominate users, and how do the predominate users navigate these waterways?
2. What are the greatest hazards they encounter on their transits?
3. What is the minimum depth of water the Coast Guard will provide ATON services?
4. Are current ATON adequately marking the waterways? What improvements can be made?
5. What technological advances can we take advantage of?
6. Is our delivery of Marine Safety Information adequate? Are there ways to improve?

Attachment 4 – Tri-Rivers Waterway Association White Paper

Updated March 1, 2022

White Paper**Requests for Funding for Lock and Spillway Repair and Channel Restoration on the
Lower Apalachicola Chattahoochee Flint (ACF) Rivers Project****Executive Summary**

The Apalachicola Chattahoochee Flint Rivers system has approximately \$6.2 billion in federal lock and spillway infrastructure that is mechanically in a failed state of repair. Many of the spillways are inoperable and all three locks have failed and are closed to most all government, commercial, and recreational vessel traffic, thus limiting the US Coast Guard and US Army Corps of Engineers (USACE) from fulfilling their fundamental functions on the rivers. Over the last thirty years the USACE has deferred maintenance and reprogrammed funding to other projects until the system is now in complete failure. Recent USACE estimates put repairs at \$92.4 million for locks and spillways and an additional \$44 million to bring the system up to full authorized standards (a total of \$136 million in federal funding).

According to a recent economic impact study, an investment of \$136 million could yield as many as 29,000 new jobs, create upwards of \$1.99 billion in total economic output, and have an 18:1 return on investment for taxpayer dollars across the three-state region.

Background and History

For more than 50 years, the U.S. Army Corps of Engineers has attempted to provide a year-round (defined as 95% of the time), 9 x 100-foot channel and functional locks for navigation interests on the Apalachicola Chattahoochee Flint (ACF) Rivers Project through: 1) the construction of multiple storage reservoirs in the Chattahoochee River and at the junction of the Flint and Chattahoochee River to augment flows needed to provide a navigation channel, 2) construction of three locks at Walter F. George dam, George W. Andrews dam, and Jim Woodruff dam, and 3) the implementation of strategies on the Apalachicola River to lessen maintenance needs. Over time, permits for dredging along the Apalachicola River were discontinued.

Funding shortfalls and reprogramming in the US Army Corps of Engineers' Civil Works budget over the last 25 years have resulted in approximately \$136 million in identified, deferred maintenance needs on the ACF, including needed repairs to locks and spillways, and channel maintenance. Absence of maintenance on the spillways has resulted in a reduced ability to manage water flow and flood control properly and safely on the system. Lack of maintenance on the locks (valves, hinges, and gates) has caused failure and permanent closure of all three locks in 2021. Maintenance dredging on the Apalachicola River is not available and limits access from Alabama, Georgia, and Chattahoochee, Sneads, Bristol and Blountstown, Florida to the Intracoastal Waterway. Consequently, commercial navigation (barge traffic) and some large recreational through-traffic on the ACF ceased in 2000.

Loss of water control due to spillway gate failure at any of the three dams would be catastrophic to the region in terms of life, safety, property, industrial and domestic water use, and the recreation and tourism industries. Several thousand jobs currently rely on industrial process water from the system. A full 23% of the base load for regional electricity generation at Plant Farley and the dams rely on a predictable water supply from the ACF. Failure of even a single spillway gate would adversely impact jobs, power generation, and perhaps property, safety, and life of those who live near and depend on the river. An untold number of industrial jobs have been lost or relocated since 2000 because of the demise of commercial navigation on the system. Eighteen of the twenty-four counties along the navigable portion of the river in the three-state region now have poverty rates of more almost twice (21%) the national average of 13.7%.

In 2019, language was included in House Report 116-83 directing the Corps of Engineers as follows: “Operation and Maintenance of Corps Dams — The Corps’ operation of hydroelectric and navigational dams provides an affordable source of hydroelectric power to communities across the nation and supports wildlife habitats, as well as recreational activities on and off the water for boaters, fisherman, swimmers, and others. These dams also promote commercial and economic activity by connecting communities up and down the waterways. It is vital that these dams are maintained to ensure the recreational and the economic sustainability of local communities. The Corps shall provide to the Committee not later than 180 days after enactment of this Act a report on the dredging and maintenance needs of the Walter F. George, George Andrews, and Jim Woodruff locks and dams.”

In response to directions included in House Report 116-83, the Corps of Engineers prepared a June 2020 report to the Committee identifying maintenance needs for the Apalachicola-Chattahoochee-Flint (ACF) River System. Of the amount appropriated for operation and maintenance on this system, it is the Committee’s intent to devote \$92 million to certain repairs and activities identified in the Corps’ report, namely, spillway and lock repairs at the Walter F. George Dam, the George W. Andrews Dam, and the Jim Woodruff Dam, and an environmental study and coordination as a prerequisite to the resumption of channel maintenance on the Apalachicola River.

Spillway repairs are necessary to ensure the dams continue to provide the benefits of hydropower generation, flood damage avoidance, municipal and industrial water supply, and wastewater effluent assimilation. Lock repairs on the three dams would provide immediate navigational access to LaGrange, Columbus, Fort Benning, Georgetown, Cedar Springs, and Bainbridge, Georgia; Valley, Phenix City, Eufaula, Columbia, Dothan, and Mobile, Alabama; and Chattahoochee, Sneads, Bristol, Blountstown, Apalachicola, Port St. Joe, Mexico Beach, Tyndall Air Force Base, and Panama City, Florida. This work is vital to reestablish commercial navigation, stimulate economic development of a depressed three-state region, and preserve the life, health, and safety of the citizens who reside there. To that end, any reprogramming of funds that would impede the Corps’ ability to carry out these tasks is discouraged. Should the Corps contemplate any reprogramming from ACF operation and maintenance funds in contradiction to this direction, the Corps is instructed to provide advance notice of thirty days to the Committee. Congress, no doubt, sees a need for repairs considering there is approximately \$6.2 billion worth of lock and dam infrastructure sitting idle and unmaintained on the lower ACF.

The \$92 million identified above addresses only a portion of the necessary repairs. An additional \$44 million is required to bring the system to full authorized standards, including all lock and spillway repairs establishing a reasonably sized navigable channel utilizing flow augmentation to create the necessary depths for moving vessels while being consistent with ecological criteria required

for the Apalachicola River, floodplain, and estuary. Consideration should also include proper handling and disposal of dredged spoils along reaches of the Apalachicola River.

A recent economic impact study of restoration of infrastructure and resumption of commercial navigation on the ACF conducted by the distinguished economist, Dr. M. Keivan Deravi suggests a resumption of navigation would be monumental for the tri-state region. Given there had been no navigation on the system for twenty years, Dr. Deravi began with an assumption of an authorized, fully functional lock system and authorized, navigable channel as a starting point. Dr. Deravi calculated there is an expectation of significant economic uplift for southwest Georgia, southeast Alabama, and north Florida. The tonnage of cargo expected to move from highways to the river represents a significant number of semitrucks removed from the highways annually, making our roads safer and saving scarce highway maintenance funds. We anticipate updating this economic study with navigation capacity criteria that better meets reasonable capacity conditions.

The southeast Alabama, southwest Georgia, and north Florida region have an excess inventory of southern yellow pine; a more than 85% greater annual inventory than our saw and pulp mills can currently handle. Commercial navigation represents a tremendous opportunity to construct at least three wood pellet mills in the tri-state region with each mill servicing a 75-mile radius. Barge is the preferred method to move wood pellets; recalling each barge can handle up to 56 truckloads of material. Each mill would create 90 direct and 185 indirect jobs and serve to replace lost coal shipping revenues into Mobile, Alabama and Brunswick, Georgia and stimulate new and increased trade through the Ports of Port St. Joe and Panama City, Florida. Other commodities moving on the system might include calcine aggregates, bauxite, ceramic pellets, fertilizers, feed minerals, other agricultural products, and miter gates and tainter valves from Steward Machine; a primary supplier of miter gates and tainter valves for the Corps of Engineers. Moreover, commercial navigation on the system used to support several strategic interests at Fort Benning, Georgia, home of the Maneuver Center of Excellence. Resumption of navigation could again support Fort Benning and possibly Tyndall Air Force Base in Florida.

In recent months, there has been significant interests on the part of a perspective industrial user to remove sands at Corley Slough (sites 39 & 40) and other within bank disposal areas. In exchange for the value of the sands, the industrial user is willing to donate funds to support habitat restoration along the river. This habitat restoration would aid in reducing erosion of these disposal areas and downstream silting in the critical slough areas along the river.

TriRivers remains fully committed to the environmental wellbeing of the entire ACF basin, specifically the ecological sensitivities of the middle and lower reaches of the Apalachicola River, its flood plain and estuaries. TriRivers is committed to sound, sustainable approaches to restoring conjunctive flows for the benefit of navigation and ecology. We fully support USACE linkage of the ACF to the ICWW project at Apalachicola, FL. We also support study of the impacts of navigation and freshwater flows on Apalachicola Bay. Despite USACE attempts to segregate these three systems or bodies of water, the fact remains they are intrinsically linked and should be considered in any ecological effect analysis.

TriRivers fully supports exploration of sub-optimal dredging, shallow draft vessel technologies, and other means beyond partial and certainly wholesale dredging of a 9X100 channel the entire length of the navigable system to achieve "an authorized channel". We fully support an adaptive approach to channel maintenance that is ecological and sustainable.

TriRivers has received a tremendous amount of interest and support from the following federal and state legislators, senators, civic leaders and other organizations: Congressman Sanford D. Bishop (GA-02), Congressman Drew Ferguson (GA-03), Congressman Barry Moore (AL-02), Congressman Neil Dunn (FL-02), Senator Tommy Tuberville (AL), Mayor Skip Henderson (Columbus, GA), Mayor Eddie Lowe (Phenix City, AL), Mayor Jack Tibbs (Eufaula, AL), Mayor Mark Saliba (Dothan, AL), Mayor Mark Blankenship (Ozark, AL), Alabama State Senator Billy Beasley, Alabama State Representative Barry Forte, Alabama State Representative Donnie Chasteen, Director Kenneth Boswell, Alabama Dept of Economic and Community Development, the River Valley Regional Planning Commission, the Southeast Alabama Regional Planning and Development Commission, and the Apalachee Regional Planning Council, and interest from the Florida Department of Environmental Protection, and the Riparian County Stakeholder Coalition.

TriRivers Waterway Development Association continues to work with various interest groups, the Corps of Engineers, and Congress to restore the ACF project locks and spillways to full operating capacity with level 2 service (locks manned 12-16 hours per day/seven days per week) that supports commercial and recreational navigation, recreation, tourism, and even hurricane evacuation for large private vessels. As stated above, spillway repair is essential. Lock repair would allow for at least 65-70% reliable navigation on the system, without dredging. Alternative dredging strategies, flow augmentation and shallow draft technology could increase reliability. Dredging, rightfully, deserves much attention and analysis and should be considered separate from lock and spillway repair. Lock and spillway repair, even in the absence of dredging, would bring much needed economic prosperity to the tri-state region.

Prepared by:

Philip W. Clayton, JD, LL.M.
Colonel (Ret.)
Executive Director
TriRivers Waterway Development Association
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334-689-8551

Attachment 5 –

TriRivers Waterway Development Association ACF Background PowerPoint

Attachment 6 – Sector Mobile ACF WAMS 6 September 2022



United States Coast Guard
 Officer in Charge
 Aids to Navigation Team Eufaula


180 Chewalla Rd.
 Eufaula, AL 36027
 Phone: (334) 687-5140

16500
 06 September 2022

MEMORANDUM

POWERS, WILLIAM, TA Digitally signed by POWERS, WILLIAM, TA FNALL 1.36.30.36.372 904912 Date: 2022.09.06 08:53:14 -0500

From: W. T. Powers, BM1
 CG ANT Eufaula

To: CGD Eight (dpw)
 Thru: CG Sector Mobile 

Subj: APALACHICOLA, CHATTAHOOCHEE, AND FLINT RIVERS WATERWAY ANALYSIS REVIEW

Ref: (a) Aids to Navigation Manual – Administration, COMDTINST M16500.7 (series)
 (b) WAMS Completion Guide

1. Pursuant to reference (a), a review was conducted of the Apalachicola-Chattahoochee-Flint (ACF) River System. Waterway Number 8073 Apalachicola River, 8074 Flint River, 8075 Chattahoochee River. Previous WAMS reviews of this area were conducted in 2015 and 2010. To ensure comprehensive data/comment collection, this WAMS review was conducted over the period December 2021 – March 2022. This review was advertised in the Local Notice to Mariners. Notifications and user surveys were posted at boat ramps and marinas located throughout the waterway. In addition, a town hall meeting was held with waterway stakeholders and users on 15Mar22.

2. INFORMATION COLLECTED & REVIEWED. This WAMS analyzes the following:

- a *Geographic Characteristics.* The Apalachicola River is approximately 101 miles running from Lake Seminole to Apalachicola, FL. The Chattahoochee River is approximately 154 miles running from Lake Eufaula to Lake Seminole. The Flint River is approximately 27 miles of river running from Lake Seminole to Bainbridge, GA.
- b *Vessel Traffic.* The primary users of this waterway is recreational boaters and marinas including numerous fishing tournaments on Lake Eufaula.
- c *Chart.* NOAA does not currently maintain or publish any updated charts for the ACF River System.
- d *Resources.* The primary servicing unit for ATON along this waterway is ANT Eufaula. There is no secondary servicing unit.
- e *User Outreach.* We conducted a notable outreach campaign including the distribution of the WAMS questionnaire through the Local Notice to Mariners, posting at boat ramps and marinas throughout the waterway, and two public meetings held at the Barbour County Chamber of Commerce. E-mail distribution was also conducted to stakeholders

Subj: APALACHICOLA, CHATTAHOOCHEE, AND FLINT
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located primarily on Lake Eufaula and a Google Document was published through the Friends of Lake Eufaula Facebook page. Seventeen surveys from recreational users, marinas, and commercial entities were received. The most received recommendation for the waterway was the addition of lights to all buoys on Lake Eufaula.

- f *Locks & Dams.* The ACF River System contains three ACOE maintained locks in various states of disrepair. The Walter F. George Lock & Dam sits at the bottom of Lake Eufaula and can only be opened on an emergency basis. The George Andrew Lock & Dam on the Chattahoochee River has doors that only open to 75% width on the down-bound side. The Andrew is also experiencing major shoaling below and inside the lock. The Jim Woodruff Lock & Dam sits atop the Apalachicola River and currently only has one operational door on the up-bound side. The status of all three locks in combination with lack of dredging and channel maintenance throughout the waterway has resulted in bare minimum commercial traffic. The 2022 Report to Congress on Future Water Resources Development (7001 Report) provides an estimated \$136 million to repair and restore navigation on the ACF river system.
- g *Aids to Navigation.* The Apalachicola River contains approximately 190 6th class steel buoys with 1k concrete sinkers and 122 day-beacons located on trees. This waterway is worked primarily with the 643501. The Chattahoochee River is divided into two sections for ATON. Lake Eufaula contains approximately 127 6th class foam buoys on dor-mor sinkers. This section of the waterway is worked primarily with the 26133 due to the status of the Walter F. George Lock & Dam. Below the Walter F. George the river contains approximately 21 5th class foam buoys and 38 6th class steel buoys with 1k concrete sinkers that are worked primarily with the 643501. The Chattahoochee River has 15 day-beacons throughout, located on a combination of wood piles and trees. The Flint River contains approximately 75 6th class steel buoys on 1k concrete sinkers and 43 day-beacons located on wood piles and trees. The 643501 is the primary servicing asset for aids on the Flint River.

3. CRITICALITY DETERMINATION.

- a *Military Critical Waterways:* The USCG is the only military organization currently utilizing the ACF River System. With restoration of the waterway, it could be used to support military activities at Fort Benning, GA. Therefore, it is my recommendation that the waterway be designated as Militarily Critical.
- b *Environmentally Critical Waterways:* A degradation of the aids to navigation system on the ACF waterway would present an unacceptable level of risk to general public safety or the environment. It is my recommendation that the waterway be designated as Environmentally Critical.
- c *Navigationally Critical Waterways:* A degradation of the aids to navigation system on the ACF Rivers would result in an unacceptable level of risk of marine accident due to the waterway's physical characteristics and difficult navigation conditions. It is my recommendation that the waterway be designated as Navigationally Critical.

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- d **Non-Critical Waterways:** It is my recommendation that none of the ACF waterway is designated Non-Critical.

4. **RECOMMENDATIONS.** I have no immediate recommendations for changes as a result of this WAMS. Future recommendations for the ACF River System will include a thorough review of the currently established ATON. After careful and detailed review, ANT Eufaula will work with Sector Mobile Aids to Navigation Division and District Eight Waterways (DPW) on the possible reduction of Fixed and Floating ATON throughout the ACF System. This potential reduction of ATON will be based upon commercial use of the waterway, operational capability of ANT Eufaula and waterway experience. The 2022 Report to Congress on Future Water Resources Development (7001 Report) outlines that the \$136 million to repair and restore navigation on the ACF river system can be done without congressional approval once funding is allocated. This restoration could result in 2.2 to 3.3 million tons of cargo moving through the waterway with an expected total economic impact of \$1.3 billion over the first ten years following repairs. Commodities proposed to move through the river system include wood pellets, calcine aggregates, bauxite, ceramic pellets, fertilizers, and other agricultural products. Miter gates and tainter valves produced from Steward Marine in Bainbridge, GA would also be transported in support of USACE operations. Commercial navigation on the system used to support a strategic interest at Fort Benning, GA, home of the Maneuver Center of Excellence (Infantry and Armor Training) would also be possible again with restored navigation. The restoration of the waterway could also be used to provide support in maintenance and operations of the Joseph M. Farley Nuclear Power Plant.

#

Attachment 7 – NNAVSAC Modern Prudent Mariner Tasking Statement and Resulting Resolution

NAV-3 considered a NNAVSAC consultation useful in connection with Level of Service Studies. Implementing task statement and resulting resolution follow.

Task Statement.

NATIONAL NAVIGATION SAFETY ADVISORY COMMITTEE (NNAVSAC)

TASK STATEMENT

Task #23-02

I. TASK TITLE

Defining the term “prudent mariner” referenced in the regulations, on nautical charts and in navigation publications.¹

(g) BACKGROUND

33 CFR 62.1(c) defines the scope of USCG ATON responsibilities and states “*The Coast Guard maintains systems of marine aids to navigation consisting of visual, audible, and electronic signals which are designed to assist the prudent mariner in the process of navigation. The aids to navigation system is not intended to identify every shoal or obstruction to navigation which exists in the navigable waters of the United States, but rather provides for reasonable marking of marine features as resources permit. The primary objective of the aids to navigation system is to mark navigable channels and waterways, obstructions adjacent to these waterways, and obstructions in areas of general navigation which may not be anticipated. Other waters, even if navigable, are generally not marked.*”

(h) PROBLEM STATEMENT

The regulation offers no explanation or definition of a “prudent mariner.” Existing Coast Guard ATON policy states that we design for the prudent mariner, in shallow water and otherwise. The Coast Guard is posing the question because the ready availability and affordability of modern navigation capabilities changes the meaning of “prudent mariner” and “accepted procedure.” Prudence transcends vessel type. Prudence accounts for limits of user expertise, vessel limitations, waterway characteristics, time of day, wind/seas/tide/current conditions, among others. Prudent

mariners do not undertake trips against current/foreseeable conditions that exceed their expertise/vessel capabilities. In some cases, transits may be undertaken by prudent mariners armed with nothing more than local knowledge and seaman's eye. Effectively defining the prudent mariner allows us to refine our ability to scope an appropriate ATON level of service.

(i) TASK

- j. Review the information provided in the task statement including the attachment.
- k. Provide comments and recommendations on a definition of "prudent mariner" as it relates to Aids to Navigation.

¹Task Title has been modified from that listed on the Federal Register notice dated 06 March, 2023.

6. ESTIMATED TIME TO COMPLETE TASK

The working group, if assigned should provide a report to NNAVSAC that includes its comments, recommendations, and responses to the proposed NVIC by the Fall 2023 meeting.

7. COAST GUARD TECHNICAL REPRESENTATIVE

Ms. Maureen Kallgren, 202-372-1561, Maureen.R.Kallgren2@uscg.mil

Resolution.

National Navigation Safety Advisory Committee

Resolution #23-02

Task Title

Defining the term “prudent mariner” referenced in the regulations, on nautical charts and navigation publications.

Task Statement

Whereas; Safe navigation of vessels involves a mariner’s responsibility to rules, regulations, and best practices, and

Whereas; Mariners have numerous means available that enable them to safely navigate their vessels, and

Whereas; Circumstances and conditions may change due to the dynamic marine environment.

Therefore, it is recommended that;

A Prudent Mariner is one who:

- Complies with rules, regulations, and best practices,
- Uses all means available to identify risk,
- Acts in ample time to mitigate risk, and
- Adapts to the prevailing conditions and circumstances.

Appendix C – Workshop Plan

This appendix addresses the overall workshop approach, rough scheduling for Phase One workshops, identified data issues and remediation plans, and logic approach for Phase One workshops. The study follows the basic DHS Risk Management Process laid out in *DHS Risk Management Fundamentals*. Workshops begin the Decide and Implement Stage.



DHS Risk Management Process

NAV-3 and Operational Commanders will prepare for workshops and at workshops –

- Decide appropriate changes and discuss implementation plans. Waterway-level plans to provide for gradual implementation over a one-to-three year period.

Operational Commanders, post workshop, will –

- Develop and implement agreed plans, sharing plans with federal/other navigation safety partners as appropriate, and communicating time-phased changes in accordance with normal requirements.
- Monitor implemented changes for intended/unintended effect.
- Adapt. Apply new risk-based design tools when available.

Overall Workshop Approach, Rough Scope, Rough Scheduling.

Workshops will be conducted in two phases. A NAV-3 SWLOSS team will facilitate and support district dpw change-candidate decision making.

Phase One workshops will be conducted after NAV approves the SWLOSS approach, including recommended discontinuation conditions and caps, and design criteria minimums. Workshops will be conducted at a rate of about one per quarter, anticipating a September 2023 start. Anticipated sequence: D1, D5, D9, D8, D7. Given the few change candidates in PACAREA districts, workshops are not considered necessary. Phase Two schedule: TBD, if/as necessary, as informed by Phase One experience.

Workshops will evaluate identified change candidates from a systems perspective, on a waterway-by-waterway basis, first considering all discontinuation candidates, selecting those most appropriate [those not selected becoming relocation candidates], then considering relocation candidates, using provided spreadsheets and CG ArcGIS tools. [\[Link to SWLOSS .xlsx workbook with imbedded district split tables for Phase One change candidates\]](#)

SWLOSS Aids Distribution in Aid Availability Matrix [\[Link to .xlsx\]](#)

Aid Availability Matrix		District					All	
WAMS Criticality Group	Aids Per Group	DRF1 Score Category						
		1	2	3	4	5	Blank	
[1-CM]	464	0	23	42	67	332	0	
[2-CEN]	5098	5	20	59	172	4804	38	
[3-CE]	1933	2	25	55	71	1779	1	PHASE TWO
[4-CN]	735	2	5	17	50	659	2	
[5-NN]	5326	1	7	23	68	5215	12	PHASE ONE
Blank	1055	1	5	5	7	1033	4	
Sum	14611	11	85	201	435	13822	57	

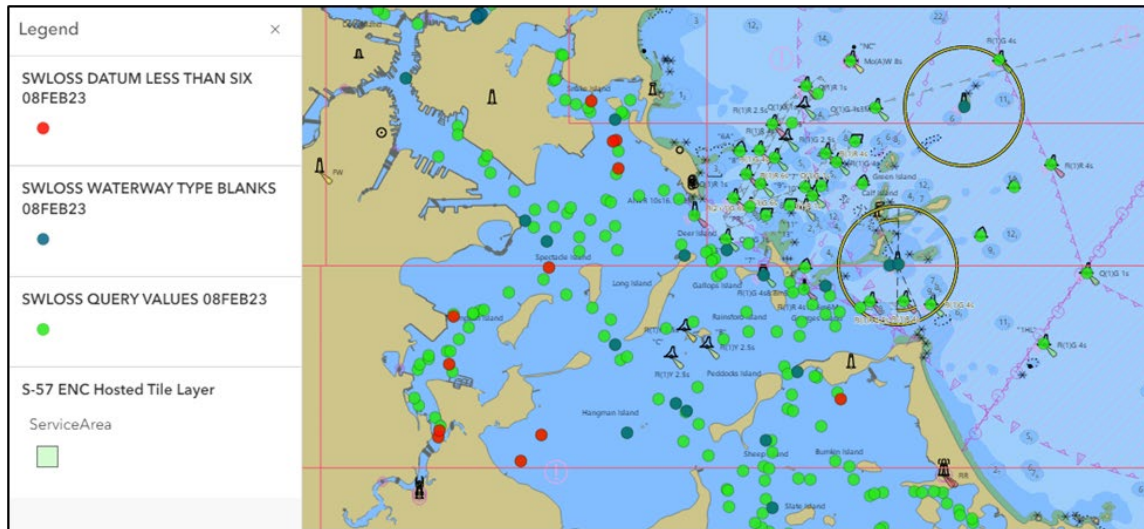
Phase One workshops will consider discontinuation and relocation actions for change candidates identified from the WAMS Waterway Criticality Group 5-NN X DRF1 Score Category 5 cell in the Aid Availability Category Matrix above. [As updated through data issue corrections discussed below.]

Phase Two will consider relocation actions to relieve serviceability challenges for change candidates identified from WAMS Criticality Groups CEN-2, CE-3, CN-4 X DRF1 Score Category 5, the remaining AA Category III aids [yellow] in the DRF1 Score Category 5 column. [As updated through data issue corrections discussed below] There are no hard limits for relocation actions. [Discontinuations will not be considered outside [5-NN] X DRF1-5 without further NAV authorization.]

Unresolved data issues.

Waterway Type blanks.

- There were almost 4700 waterway type blanks within the federal constellation [after filtering for aid descriptions of interest] as of the 8 February 2023 query, including an unknown number of SWM-SWNM.
- NLT 31 March NAV-3 will share a spreadsheet identifying ATONIS Waterway Type blanks, sorted by district, along with a link for a distinctly coded corresponding GIS layer [\[Link to GIS\]](#). NAV will request districts correct the blanks, beginning with SWM and SWNM [with low DRF1 scores and datums less than six feet] in advance of workshop, others as reasonably possible. [Viewing Waterway Type blank layer together with SWM-SWNM layers should help identify SWLOSS related blanks for priority correction. Waterway Type blank spreadsheet will contain standard DRF1 score and datum info.] See excerpt below.



WAMS Criticality Group blanks.

- There were more than 1050 WAMS Criticality Group blanks among SWM-SWNM designated aids.
- NLT 31 March 2023 NAV-3 will share documents [as for WWT blanks] requesting districts identify and correct WCG [5-NN] aids in advance of workshop, others as reasonable.

Anomalous WAMS Criticality Group Designations.

- As of this writing District 7 aids are all designated in WAMS Criticality Groups [1-CM] and [2-CEN], the vast majority in the latter. This appears to be an outlier condition, in stark contrast to all other districts, including adjacent districts, especially evident at district boundaries, where both Districts 5 and 8 have numerous [5-NN] aids in like waterways.
- NLT 31 March 2023, NAV-3 will provide a spreadsheet for SWM-SWNM designated aids, currently identified as WCG [2-CEN] along with standard DRF1 Score, datum, other task useful fields.
- CG-NAV will request District 7 review these WCG designations NLT August 31, 2023 [in advance of workshop] to identify those belonging in other WAMS Criticality Groups, [5-NN] in particular.
- Aids identified as [5-NN] will be included in Phase One. Aids identified as WCG [2-CEN], [3-CE], [4-CN] will be included in Phase Two.

Phase One Workshop – Logic Sequence.

General. Phase One will focus on aids in WCG [5-NN] X DRF1-5. [See SWLOSS Distribution Table above.] As detailed in Methodology, SWLOSS focused first on the subset of Shallow Water aids, in the lowest Aid Availability Category, Category III; in the lowest WAMS Waterway Criticality Group, Non-Critical [5-NN]; and the lowest Discrepancy Response Factor Part One Score Category, DRF1-5. These aids are almost exclusively located in Districts 1, 5, [7 TBD], 8 and 9.

SWLOSS further filtered this subset for DRF1 score and datum splits as shown in the table below. Change candidate categories are shaded.

Aids with DRF1 Scores below 15 and servicing problematic datums of less than six feet are considered priority candidates for change [first row], to be considered first—for discontinuation, if eligible—or for relocation to deeper water, as appropriate.

Aids with DRF1 Scores below 15 and possible servicing problematic datums of less than eight feet may be priority candidates for change [second row]—for discontinuation, if eligible—or for relocation to deeper water, as appropriate.

These change candidates have the greatest potential to realize efficiencies and relieve serviceability challenges.

Non-priority change candidates, DRF1 Scores less than 15, with datums of eight feet or greater [light yellow] may be considered for discontinuation or relocation, subject to the same criteria.

Discontinuation/Relocation Change Candidates – Low DRF1 Scores - Non-Critical Waterways

Shallow Water Aids - AAC III - DRF1 Cat 5 - WCG-5 [NN] Only (5215)							
Datum	Total Aids	Subset of DRF1 < 25	Subset of Floating < 25	Subset of Fixed < 25	Total DRF1 < 15	Subset of Floating < 15	Subset of Fixed < 15
0ft or Greater, < than 6ft	3120	2759	567	2192	1431	317	1114
6ft or Greater, < than 8ft	461	429	318	111	254	198	56
8ft or Greater	1630	1458	1155	303	795	643	152
*Note: Data of four (4) aids included in this set have negative datums and are therefore not included in the table.							

[\[Link to supporting .xlsx with national and district split views\]](#)

On SWLOSS approach approval/NAV direction, coordinate, agree, promulgate schedule. Duration based on change candidate population, intangibles. Planning default/point of departure: one full work week.

Phase One Workshop – Preparations

CG-NAV-3 Preparations:

- Share 8 February 2023 SWLOSS query update [[Link](#)] with supporting CG ArcGIS links [[Map 1](#), [Map 2](#)], including relevant aid context and change candidate layers, AIS track and CAG layers.
- Share data issue spreadsheets for Waterway Type blanks and WAMS Criticality Group blanks, request corrections.
- Request D7 review WAMS Criticality Group [2-CEN] designations for aids that may belong in groups three through five. Request ATONIS corrections, as needed. Priority on aids belonging in [5-NN] X DRF1 Score Category 5, DRF1 Scores below 15/datum less than six feet.
- Share strawman workshop logic sequence. Request comments, revise, re-share.

In advance of individual workshops, NAV-3:

- Update queries, change candidate summary tables, supporting .xlsx, —blanks cleared, data scrubbed.
- Update all worksheet and GIS layers.
- Share SWLOSS GIS products In CG ArcGIS Online [or Enterprise if available] organized to support process, with Change Candidates icons for DRF and datum attributes with click and display for relevant data for each change candidate [ATONIS DRF1 score, datum set/found, other relevant]. SWLOSS CG-ArcGIS tools will feature best available ENC base layer, CG-INV provided ten-year CAG data layer; NAVCEN provided, marine cadaster, one-minute mark AIS track data layer, an all SWM-SWMN layer, among others.
- Design and share a spread sheet tool to guide process and document results—a very abbreviated copy of district SWLOSS.xlsx with columns Count, UAID, LLNR, Considered [Y or blank, blank meaning N], Action Taken [D, R, O, N; Discontinue, Relocate, Other (typically lighting an unlighted aid to achieve design compliance), None]; for Relocations: Bearing and Distance from Current AP, Approx New Datum. For Discontinuances, Design Compliance [Y or blank, blank meaning N] and Notes [e.g., Lighted UAID/LLNR to achieve design compliance, characteristics.] Features to track segment, waterway, and district: discontinuations v limits, relocations, “other” changes; number of aids considered, change counts by total, by change type; priority category splits for each. Comment field for each decision.

District Preparations:

- Take requested data issue correction and workshop process review actions.
- Scrub provided SWLOSS data. Review key data elements. Correct any clear errors in filtering field data.
 - DRF1 Scores. First, DRF1 Scores, identify change candidate aids that clearly don't belong in the less than 15 category and vice versa. Correct in ATONIS.
 - Datum. Second, check datum values. The study flagged aids as datum less than six feet if ATONIS showed a found OR set value of less than six feet [greater than zero]. Flag those that do not belong. Flag any that pose serviceability challenges, not already identified. Take action to ensure ATONIS corrections, as appropriate.
- Prepare consistent with shared plans and schedule.
 - Identify turn, recovery and track keeping segments for SWM-SWNM waterways; document [by GIS screenshots, other means]
 - Identify Design Vessel(s) for each waterway, guided by AIS profiles and local knowledge [link]
 - Identify 80% visibility conditions for affected waterways, be prepared to calculate luminous ranges/articulate operational ranges to ensure compliance with minimum design standards

Workshop Conduct. Workflow & Sequence.

Note all phase one waterway change candidates in SWLOSS ArcGIS tool. Proceed by waterway from greatest number of priority changes [by visualization/count] to least, in interest of making best overall progress.

Waterway Level Review:

Consider all change decisions in smallest scale GIS waterway, segment, and aid level context with CAG and AIS layers. Consider predominant users. Cargoes. Hazards. Qualitative risk. Mini WAMS considerations checklist. [\[Link to WAMS Guideline\]](#)

Step One – Evaluate Discontinuation Change Candidates. Identify ALL discontinuation eligible change candidates [all change candidates in track keeping segments] [Turn on change candidate layers in GIS. (Districts identified waterway segments.)] [Document all discontinuation eligibles in tracking sheet.] Use CG ArcGIS SWLOSS [\[Link to GIS\]](#) to view in waterway/segment context.

- Begin with discontinuation eligible priority change candidates [priority change candidate layer icons]. [DRF1 scores less than 15 and datum less than 6 feet]. Where more than one discontinuation eligible aid per segment [priority or not], select the most appropriate, [subject to segment cap – NMT 34% of aids in any one track keeping segment [track], waterway cap – NMT 20% of all aids in track keeping segments in the affected waterway [track], and design requirement criteria [for Shallow Waterways, in track keeping segments, [day and night aid visibility requirements](#) are adjusted to one fixed light, or two lighted aids ahead; with maximum spacing of 2 miles, where no range is present/landmarks are lacking]. [document in tracking sheet]

- Continue until all discontinuation eligibles have been considered and decided; all primary and collateral changes documented in tracking sheet.
- Review discontinuation actions for compliance with limits and minimum design requirements. Adjust light intensity, light unlighted aids, re-space aids, as may be necessary/useful to meet design standard.
- Consider based upon available NAIS tower coverage and loading (permanent and designated storm signals):
 - Making newly important lights AIS synthetics, where appropriate, to mitigate discrepancy risk.
 - Making physical aids discontinued, AIS virtuals, where appropriate, for change management, physical relocation, and renumbering efficiency reasons.
- The study does not contemplate other AIS uses due to current system limitations.
- Document all intended changes in tracking sheet. [No limits on lighting unlighted aids or respacing to meet design requirements.]

Step Two. Evaluate Relocation Change Candidates. There are no hard limits for relocations, although relocations should generally be limited to less than 20% of the number of total aids in the waterway.

- For all remaining change candidates--including discontinuation eligibles not discontinued—beginning with priority change candidates, consider relocation where feasible and appropriate. [document in tracking sheet. Relocation considered (check box), Relocation Indicated Yes or No, with comments as useful. Where relocation indicated, record target AP in space provided.]
- Repeat for non-priority candidates, considered servicing challenges [i.e., close to six feet, notionally for datums less than eight feet]. Document as for all aids considered for relocation.

Step Three – Review for completeness and system sensibility.

- Ensure all change candidates are checked for consideration and for action where indicated, with supporting data/comments where required.

Step Four – Develop Waterway Level Implementation Plans.

- Develop an implementation plan for each waterway accounting for any USACE planned dredging operations, normal servicing schedule, and change management considerations.
- Where feasible, plans should provide for gradual implementation over at least three years, but not more than five, monitoring for effect.
- Engage/notice partners/stakeholder/public as required by law/policy/professional courtesy.