

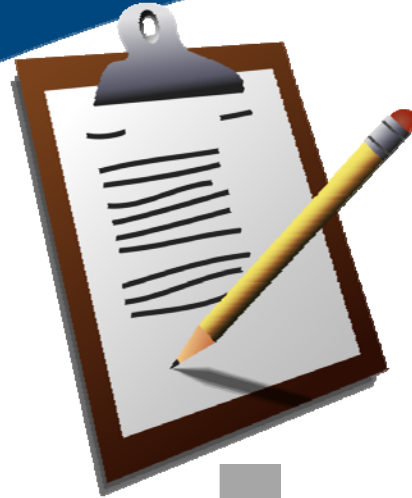


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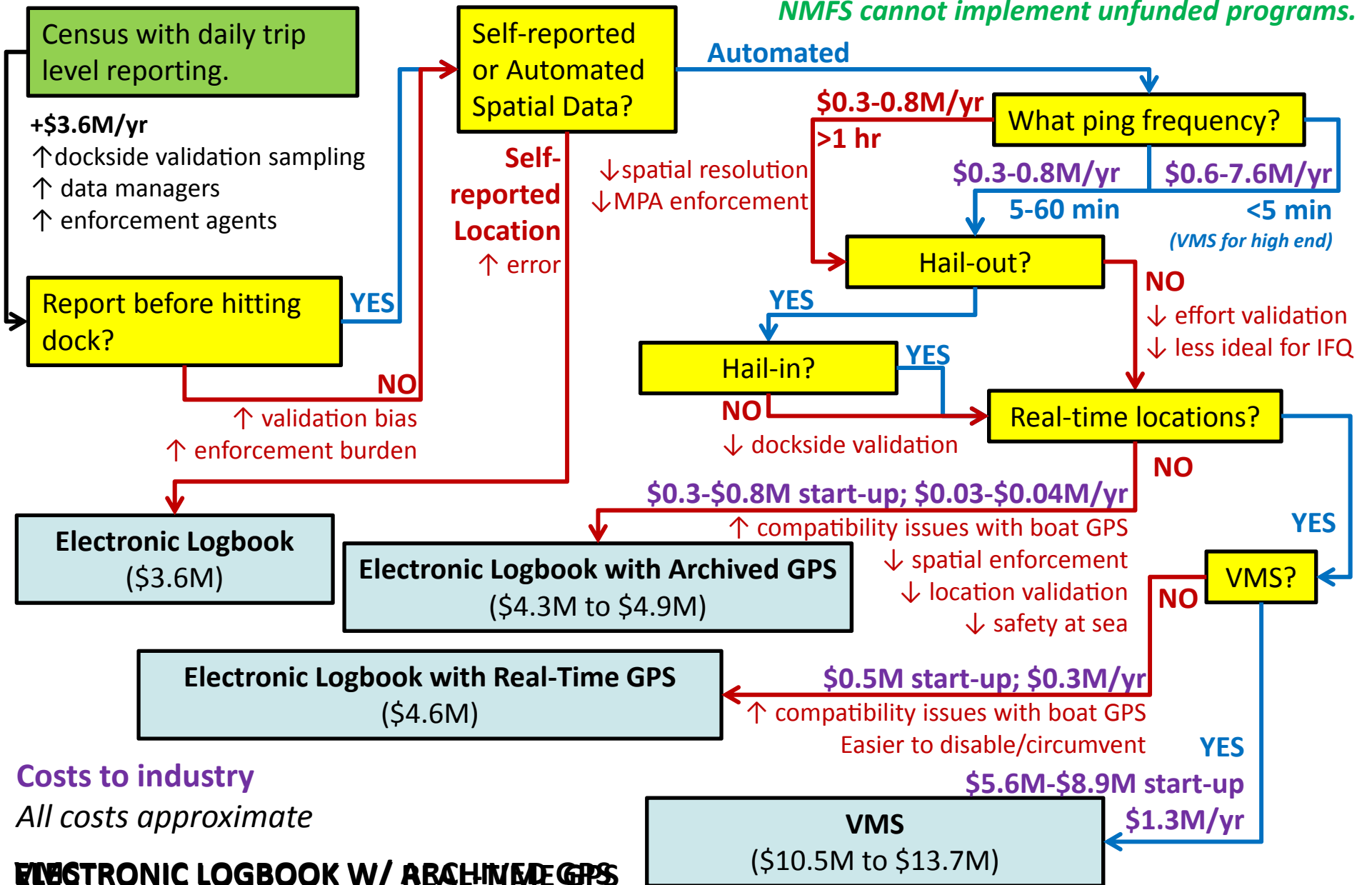
# Gulf of Mexico For-Hire Electronic Monitoring: Flowchart



- ✓ *Data collection*
- ✓ *Data management*
- ✓ *Validation*
- ✓ *Compliance*
- ✓ *Timeliness*
- ✓ *Calibration*
- ✓ *Cost*

Gulf Council Meeting  
April 2016  
Austin, Texas

NMFS cannot implement unfunded programs.



**Costs to industry**

All costs approximate

**ELECTRONIC LOGBOOK W/ ARCHIVED GPS**

Electronic Logbook with Archived GPS is the preferred reporting method for NMFS. It is a cost-effective and accurate reporting method. It requires new technology for the fishery, but it is a one-time cost. It is a cost-effective and accurate reporting method. It requires new technology for the fishery, but it is a one-time cost. It is a cost-effective and accurate reporting method. It requires new technology for the fishery, but it is a one-time cost.

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## **ELECTRONIC LOGBOOK**

PRO: Similar to existing headboat system, some infrastructure exists, vessel-specific catch

CON: validation needed for self-reported spatial and catch data

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## **ELECTRONIC LOGBOOK W/ ARCHIVED GPS**

PRO: Design could be flexible, with minimum standards, and operate on many devices.

CON: Requires new hardware, software, might not be flexible enough for an IFQ-type program

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## **ELECTRONIC LOGBOOK W/ REAL-TIME GPS**

PRO: Daily trip or set-level reporting. Well-suited to IFQ program.

CON: Requires new hardware, software, personnel for field validation, enforcement, database, and GPS management

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## **VMS**

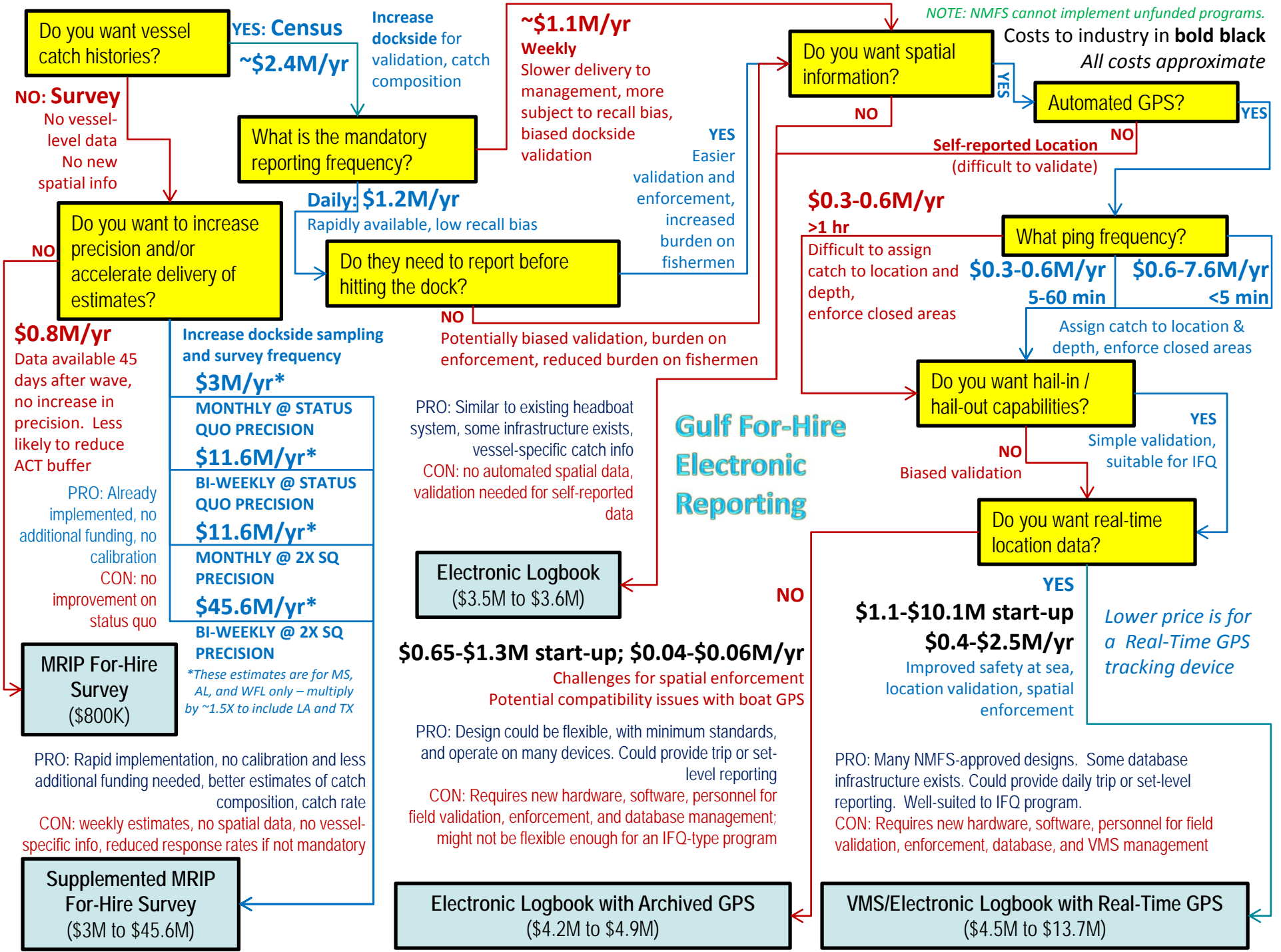
PRO: Many NMFS-approved designs. Some database infrastructure exists. Daily trip or set-level reporting. Well-suited to IFQ program. Harder to circumvent. Easiest option for enforcement.

CON: Costly to industry, requires extra personnel for VMS management

Questions?



NOAA FISHERIES



Base Census style design cost for the Gulf of Mexico for 1,723 vessels.

Activity	Cost Type	Est. Cost	Comments/Source
<b>Stakeholder Outreach and Certified Selection Letters</b>	Start-up and yearly reoccurring compliance letters (gov't)	Start-up: \$25,500 Reoccurring: \$10,500	Start-up 7 meetings @ \$2,000 per meeting, Certified Letters (Start-up and reoccurring): 1,723 @ approximately \$6 per letter
<b>Software Development, Hardware purchase, and Hardware Maintenance</b>	Start-up and Reoccurring (gov't)	Start-up: \$125,000 Reoccurring: \$20,000	Costs for Web site/app development. These costs could be reduced if existing software applications (such as SE Headboat Survey) are used instead of any new software developed. However, modifications of data fields, data storage and data export procedures would be required to accommodate the increased number of vessels. Additionally, a server (\$25,000) will need to be bought to store data; included in the cost estimate. There would also be reoccurring costs for hardware/software and database maintenance.
<b>Field Personnel – Salaries, Benefits, Overhead, Training, Travel, and Equipment</b>	Start-up and Reoccurring (gov't)	Annual: \$2,220,000	33 Port Agents @ an approximate 53 vessels per port agent: \$64,000 for salary, benefits, and overhead per port agent – source SE Headboat Survey. Travel and equipment~\$60 per vessel (1,723 in the Gulf) – source MRIP pilot study; costs are higher for more remote areas vs. ports with larger clustering of vessels.

**Start-up: \$2,370,500**  
**Reoccurring: \$2,250,500**  
**Two Year Total: \$4,621,000**

## Reporting Frequency Costs for the Gulf of Mexico for 1,723 vessels.

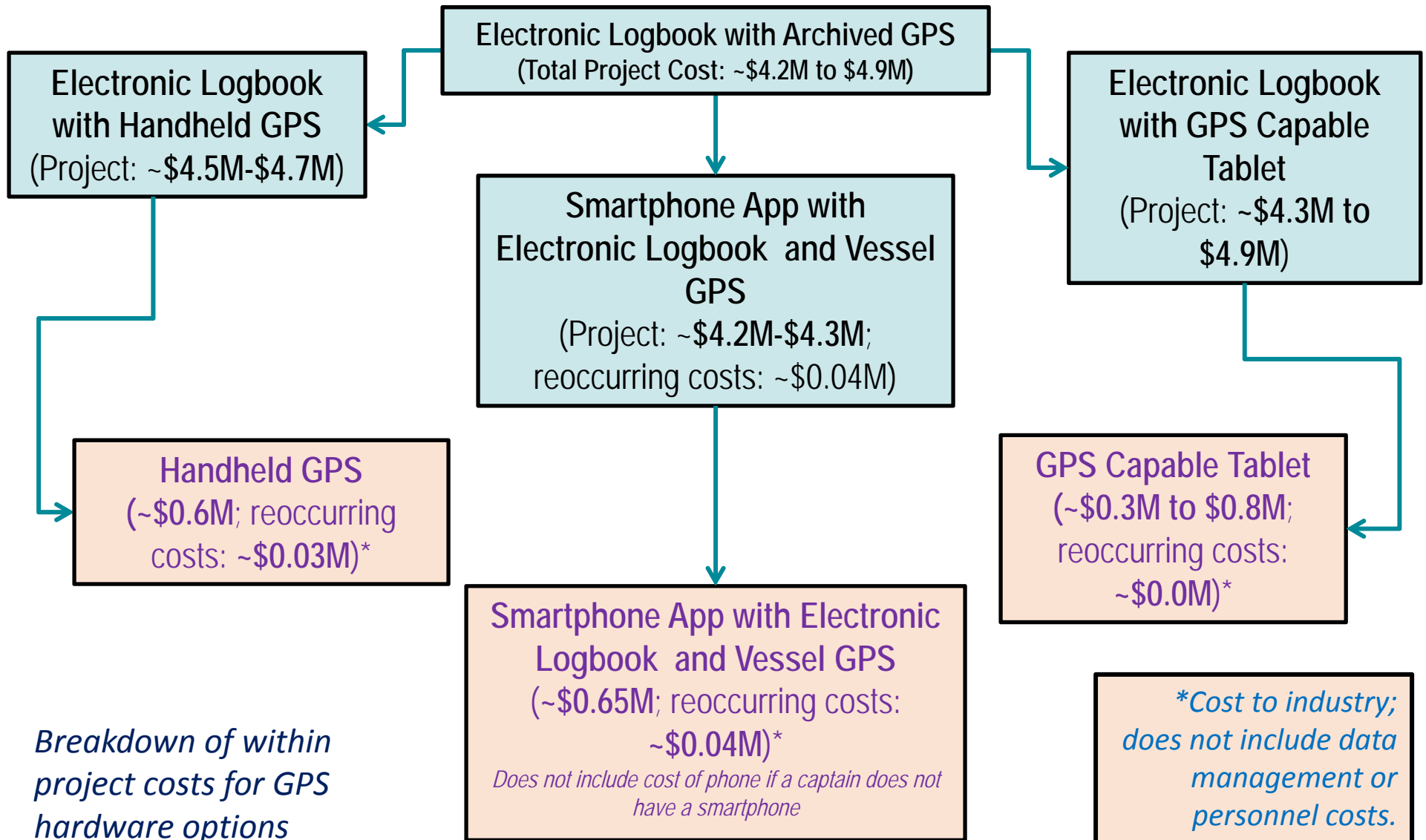
Frequency	Activity	Cost Type	Est. Cost	Comments
Daily Reporting	Database and Administrative Personnel	Start-up and Reoccurring (gov't)	Annual: \$325,000	Salaries and administrative costs for: Project Manager (1-GS-14), database managers (2-GS-13) and administration (1-GS-13). Additionally, 1 Gulf Data Analysts @ GS-13 salary + benefits
	Enforcement & Compliance Monitoring; Salaries, benefits, and overhead.	Start-up and Reoccurring (gov't)	Annual: \$900,000	To properly conduct compliance an increase of 5 Enforcement Officers and 1 Supervisory Enforcement Officer are estimated to be needed. Based on OLE estimates 2016.
<b>Total: \$1,225,000</b>				
Weekly Reporting	Database and Administrative Personnel	Start-up and Reoccurring (gov't)	Annual: \$230,000	Salaries and administrative costs for: Project Manager (1-GS-14), database managers (1-GS-13) and administration (1-GS-13). Additionally, 1 Gulf Data Analysts @ GS-13 salary + benefits
	Enforcement & Compliance Monitoring; Salaries, benefits, and overhead.	Start-up and Reoccurring (gov't)	Annual: \$900,000	To properly conduct compliance an increase of 5 Enforcement Officers and 1 Supervisory Enforcement Officer are estimated to be needed. Based on OLE estimates 2016.
<b>Total: \$1,130,000</b>				

Electronic Logbook  
(~\$3.5M to \$3.6M)

- Pro: Similar to existing headboat system, some infrastructure exists, vessel-specific catch info, self-reported catch area and depth option
- Con: Self-reported spatial data (point and click google maps), validation needed for self-reported data, no “hail in/ hail out” capabilities, difficult to enforce closed fishing areas



# Breakdown of Alternative Archived Spatial Data Options



## Electronic Logbook with Handheld GPS (Archived GPS)

(Project: ~\$4.5M-\$4.7M)

- Pro: Design could be flexible, with minimum standards, and operate on many devices. Could provide trip or set-level reporting
- Con: **Never been tested**; Requires new hardware, software, personnel for field validation, enforcement, and database management; No Real-Time data, increases difficulty of enforcement, requires Captains to turn on the device and make sure it is on the vessel, not mounted, requires unobstructed view of sky to obtain GPS; Requires Captains to upload the GPS points separately from the Logbook; reoccurring service cost; might not be flexible enough for an IFQ-type program

Smartphone App with Electronic Logbook with Archived Vessel GPS  
(Project: ~\$4.2M-\$4.3M)

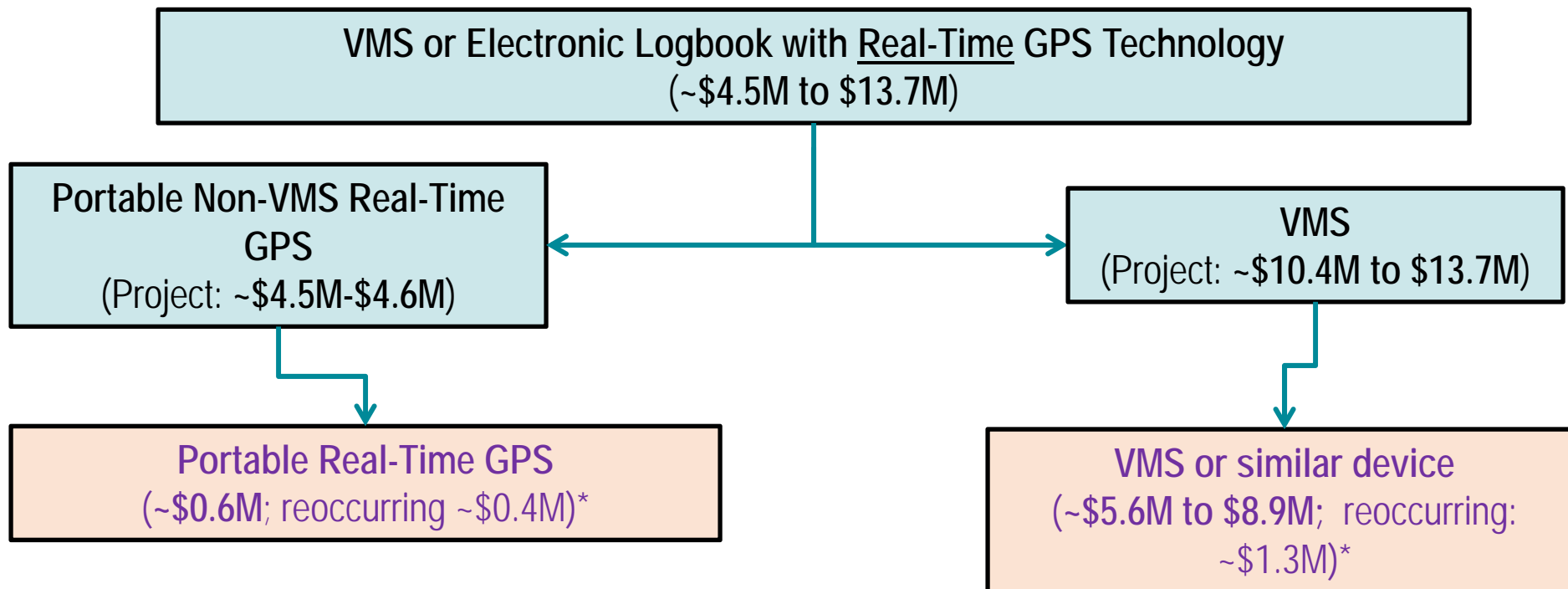
- Pro: Lowest cost to industry that provides location data, flexible for smartphone and tablet use, allows real time hail out and limited hail in- requires cellphone coverage to issue real time hail in/hail out (timestamp could be utilized for hail in), utilizes vessel GPS via hard connection, can provide text/email alerts captains/owners about season and area closures; provides any “ping” interval
- Con: **Never been tested**; Requires smartphone/tablet (only cost to industry), software, and database management; No Real-Time data- increases difficulty of enforcement, requires Captains to turn on the device and make sure it is on the vessel, must be compatible with vessel GPS (USB connection; different GPS types may require different version of app- “not standardized”); may need additional memory added to phones (apple would be external; android would be SD card); might not be flexible enough for an IFQ-type program

Electronic Logbook with GPS Capable Tablet (Archived GPS)  
(Project: ~\$4.3M to \$4.9M)

- Pro: Designed with GPS capabilities, larger memory than smartphones, allows map features, can “chart” GPS locations on maps for captains to see- could attribute catch to map charted points, larger screen allows easier use of forms, possible limited hail in/hail out, design could be flexible, with minimum standards, and operate on many devices. Could provide trip or set-level reporting
- Con: **Never been tested**; Requires new hardware, software, personnel for field validation, enforcement, and database management; No Real-Time data, increases difficulty of enforcement, requires Captains to turn on the device and make sure it is on the vessel, not mounted, requires unobstructed view of sky to obtain GPS; might not be flexible enough for an IFQ-type program

## Spatial information costs using non real-time GPS information for 1,723 Gulf of Mexico vessels

Technology	Frequency	Cost Type	Est. Cost	Comments
Handheld GPS with Archive Capabilities*	10 s -60 min; 0-15 m accuracy	Start-up & Reoccurring (Industry or Gov't)	Start-up: \$570,000 Reoccurring: \$26,000	Handheld GPS units (~300/year; some require yearly renewal)
Tablet with Satellite GPS Capabilities (Archiving Data)*	Custom; 0-15 m accuracy	Start-up & Reoccurring (Industry or Gov't)	Start-up Low: \$259,000 Start-up High: \$776,000	Satellite capable tablets (up to \$450; 3G capable but would require activation and data plan at additional cost; 3G not necessary for GPS to work)
Smartphone App (Hardwired to Vessel GPS) & Data Management	Custom; 0-3 m accuracy	Start-up & Reoccurring (Industry and Gov't)	Start-up: \$600,000 Reoccurring: \$36,000	App development, software updates, patches, and data management. Costs using existing applications (SE Headboat Survey)
Increased Memory Storage for Smartphones		Start-up (Industry)	Start-up: \$50,000	Depends on ping rate; some smartphones are not made to accept an added SD card (would require external storage if not able to accept an additional or better SD memory card). **
Archived GPS Data Administration & Management (non-phone app)		Start-up & Reoccurring (Gov't)	Start-up: \$500,000 Reoccurring: \$36,000	Costs using existing applications (SE Headboat Survey); however costs were increased due to vessel numbers and data management needs.
<u>Handheld GPS</u> Start-up Total: \$1,070,000 Reoccurring Total: \$62,000		<u>Tablet w/ Satellite Capabilities</u> Start-up Total Low: \$759,000 Start-up Total High: \$1,276,000 Reoccurring Total: \$36,000		<u>Smartphone App + Vessel GPS</u> Start-up Total: \$650,000 Reoccurring Total: \$36,000



- Pro: Cheaper real-time alternative to VMS; allows hail in/ hail out; provides 5-60 minute “pings”; standardized across vessels; user friendly
- Con: Never been tested; fewer hardware options, reoccurring annual costs (cheaper than VMS), Requires new hardware, software, personnel for field validation, enforcement, and database management
- Pro: Many NMFS-approved designs. Some database infrastructure exists Could provide daily trip or set-level reporting. Well-suited to IFQ program.
- Con: Requires new hardware, software, personnel for field validation, enforcement, database, and VMS management

**Non VMS Real-Time GPS (includes “Hail in/Hail Out”) costs for 1,723 Gulf of Mexico vessels.**

Technology	Frequency	Cost Type	Est. Cost	Comments
Handheld Real-Time GPS Device	5-60 min; 5 m accuracy	Start-up & Reoccurring (Industry or Gov't)	Start-up: \$525,515  Reoccurring: \$345,000	~\$105 for unit; \$200/year per vessel for service. Census base outreach events can include the instruction on how to use these units; no additional cost
GPS Unit Administration and Management		Start-up & Reoccurring (Gov't)	Start-up: \$500,000  Reoccurring: \$36,000	Costs using existing applications/software (SE Headboat Survey); however costs increase due to increased vessel numbers and data management needs.

**Start-up Total: \$1,025,515**  
**Reoccurring Total: \$381,000**

Item	Frequency	Cost Type	Est. Cost	Comments
<b>VMS Units and Installations (if required)</b>	1-60 min; 1-15 m accuracy	Start-up (gov't or industry)	Start-up: \$4,307,500 (low estimate) Start-up: \$7,581,200 (high estimate)	1,723 for-hire vessels need to obtain a VMS in the Gulf of Mexico. Costs for VMS units range from \$2,300 to \$3,800. Installation costs per vessel \$200 to \$600 depending on proximity to marine electrician.
<b>VMS Service Charges &amp; Software Updates</b>		Start-up & Reoccurring (industry)	Annual: \$1,290,560	\$60 per month per vessel; \$720 Reoccurring per vessel x 1,723 vessels for Reoccurring charge; additional \$50,000 Reoccurring for software patches and updates.
<b>VMS Personnel</b>		Start-up & Reoccurring (gov't)	Annual: \$575,000	Salary and benefits for five VMS technical staff (monitor 340+ vessels each) and one OLE Helpdesk person.
<b>Data Admin. &amp; Management Costs (eLog-Compatible)</b>		Start-up & Reoccurring (gov't)	Start-up: \$600,000 Reoccurring: \$50,000	Costs to create and maintain an eLog/VMS compatible system

**Low Total (Start-up): ~\$6.83M**  
**High Total (Start-up): ~\$10.1M**  
**Reoccurring: ~\$2.52M**  
**Low Two Year Total: ~\$9.35M**  
**High Two Year Total: ~\$12.62M**



**Total costs of census style project for each method (not including location self-reporting)**

Method	Frequency	Cost	Comments and Unit Costs
<b>VMS</b> (with new logbook incorporated system)	Daily	Year One (Start-up): \$10.5-\$13.7M Year Two (reoccurring): \$6.0M Two Year Total: \$16.5-\$19.7M	If VMS is required, some expenses for port sampling validation of fishing effort and enforcement compliance may be reduced. VMS is currently not compatible with the current SRHS eLog setup; this would require a new eLog platform development.
	Weekly	Year One (Start-up): \$10.4-\$13.6M Year Two (reoccurring): \$5.9M Two Year Total: \$16.3-\$19.5M	
Electronic Logbook with Real Time GPS ( <u>Non VMS</u> option)	Daily	Year One (Start-up): \$4.6M Year Two (reoccurring): \$3.9M Two Year Total: \$8.5M	<u>Non VMS Real-Time GPS</u> Start-up Total: \$1,025,515 Reoccurring Total: \$381,000
	Weekly	Year One (Start-up): \$4.5M Year Two (reoccurring): \$3.8M Two Year Total: 8.3M	
Electronic Logbook <u>Only</u>	Daily	Year One (Start-up): \$3.6M Year Two (reoccurring): \$3.5M Two Year Total: \$7.1M	
	Weekly	Year One (Start-up): \$3.5M Year Two (reoccurring): \$3.4M Two Year Total: \$6.9M	

Method	Frequency	Cost	Comments and Unit Costs
Electronic Logbook with <u>Archived</u> GPS	Daily	Year One (Start-up): \$4.3-\$4.9M Year Two (reoccurring): \$3.6M Two Year Total: \$7.9-\$8.5M	<p><b>Handheld GPS</b> Start-up: \$1.1M Reoccurring: \$0.06M</p> <p>Year 1 (Daily): \$4.7M; Year 1 (Weekly): \$4.5M</p> <p><b>Tablet with Satellite Capabilities</b> Start-up: \$0.76-\$1.3M Reoccurring: \$0.04M</p> <p>Year 1 (Daily): \$4.4M- \$4.9M (Weekly): \$4.3M-\$4.8M</p>
	Weekly	Year One (Start-up): \$4.2-\$4.7M Year Two (reoccurring): \$3.5M Two Year Total: \$7.7-\$8.2M	<p><b>Smartphone App + Vessel GPS</b> Start-up: \$0.65M Reoccurring: \$0.04M</p> <p>Year 1 (Daily): \$4.3M (Weekly): \$4.2M</p>