NOAA FISHERIES

For-hire Data Collection Considerations

Better data, better management

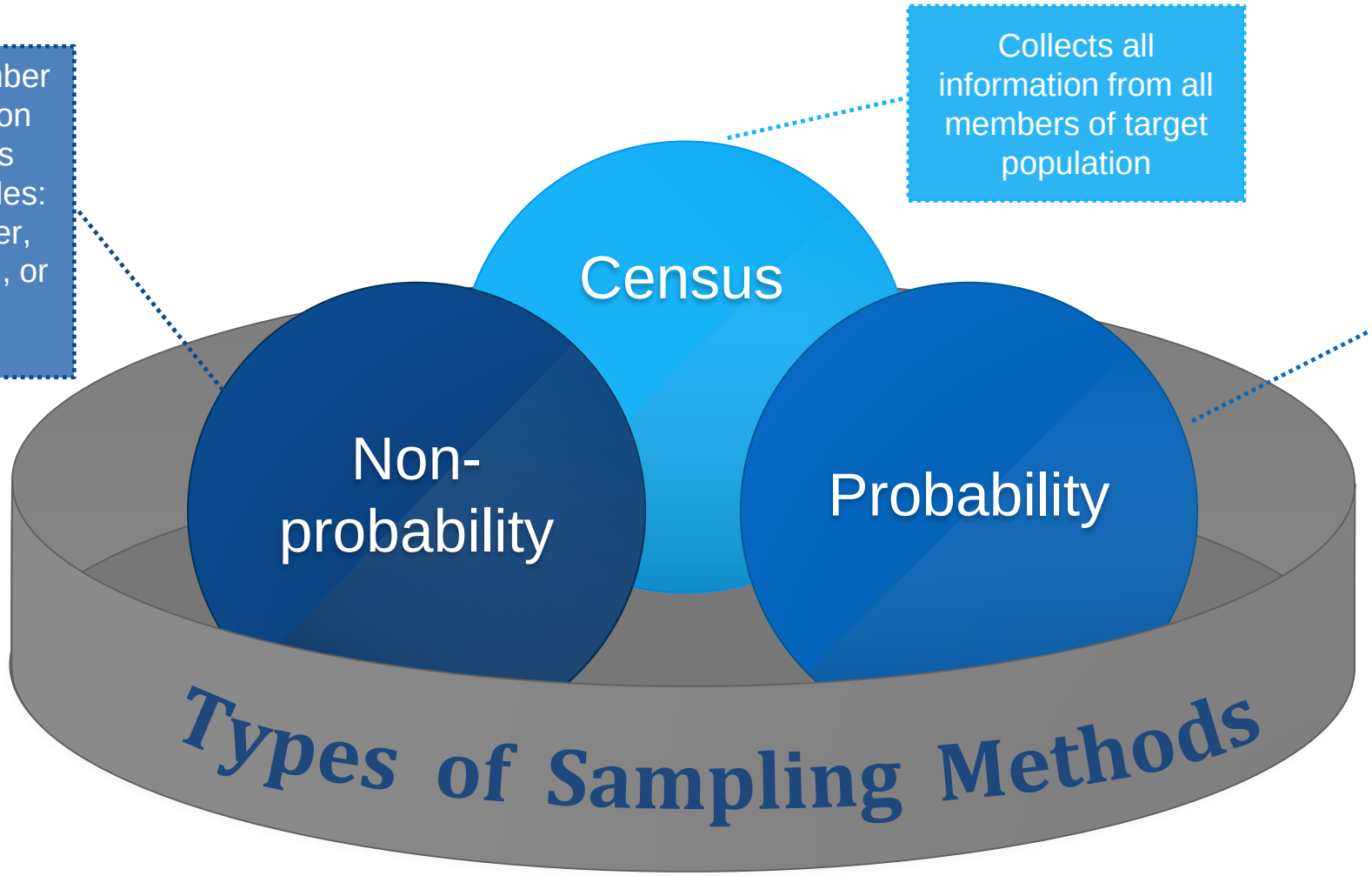
U.S. Department of Commerce
National Oceanic and Atmospheric Administration
National Marine Fisheries Service

Why collect fisheries data?

- Provides data to inform stock assessments, management advice, and monitor catches
- Catch data
  - Collected from anglers what is caught during fishing trips. Supplemental information from field samplers from intercept surveys.
- Effort data
  - Collected through in person interviews, phone calls, mail, or electronic reporting. Every survey has its own method of data collection. Example questions include: how long they fished, targeted species, and number of trips.

Recreational Fisheries Data Usage in Management

- High quality catch and effort statistics are needed to determine effects of fishing and develop sound management strategies
- Continuous monitoring of catch and effort is needed to assess trends, evaluate management impacts, and project different management scenario outcomes.
- The quality of fishing catch and effort statistics depends on the sampling design – sample framework, data collection methods, and data estimation process


Probability of member of target population being sampled is unknown. Examples: Opt-in or volunteer, snowball sampling, or convenience sampling.
Collects all information from all members of target population
Uses random selection and each member has known chance of sampling. Example: MRIP APAIS Survey
Census
Non-probability
Probability
Types of Sampling Methods

Data Collection vs Sampling Methods

- Electronic reporting (logbook) is a data collection *not a sampling method*
  - An appropriate survey design is needed to ensure accurate estimation of total fishing effort and catch
  - May facilitate more timely or better quality data

- Probability Sampling
  - Requires well-designed sampling frame
  - Allows for final estimation
  - Handles incomplete coverage and non-responses

Elements to a good survey design

- 2019 For-Hire Data Collection and Validation Methods Workshop
- The quality of a survey design depends on data collection, estimation, and validation methods
- Two or more data collections allow for validation of self-reported data
  - E.g., vessel trip reports (logbooks) with report from a dealer, observer, or port sample interception
  - Commercial fishery sampling designs use this design
- Dockside survey based on probability sampling is a critical component to mandatory for-hire reporting
  - Includes methods to account for trips and catch not reported

Workshop Design Standards

- Quality data is the combination of a good survey design, compliance with design, and accurate reporting

- Logbooks should contain built-in quality controls
- Timely reporting should be required and enforceable
- Maintain high compliance
- Capture/recapture validation survey statistical method
  - Capture is the vessel trip report (logbook)
  - Recapture is the dockside intercept
  - Recapture must be independent of capture and be probability based

Capture/Recapture Challenges

- Requires registration of each trip
- Requires vessel trip report to be submitted prior to intercept (e.g., prior to offload of fish). This ensure independence of intercept survey
- Sufficient enforcement and compliance monitoring to reduce number of unreported trips
- Observers used to increase accuracy of released catch data

Original SEFHIER Program

Program purpose and design

Original program's purpose and need

- Purpose: to improve accuracy and timeliness of landings, discards, effort, and socioeconomic data of federally permitted for-hire vessels participating the Gulf reef fish and coastal migratory pelagic fisheries.

- Need: to improve management and monitoring of Gulf fisheries.

Original SEFHIER Design

- Included variety of data and accountability reporting standards
- Mimicked commercial fisheries sampling designs
  - Hail-outs for trip auditing, VMS positioning for validation, and mandatory vessel trip reports (logbooks)
- Independent validation survey to account for unreported trips and accuracy of self-reported data
  - Utilizes capture/recapture statistical method
- Compliance measure: logbook submission before permit renewal
- Identified gaps
  - No sampling/enforcement at private landing locations
  - Did not collect discard disposition
  - Limited weight and length data collected

Designing Data Collection for Fisheries Management Use

Design needs, components, and options

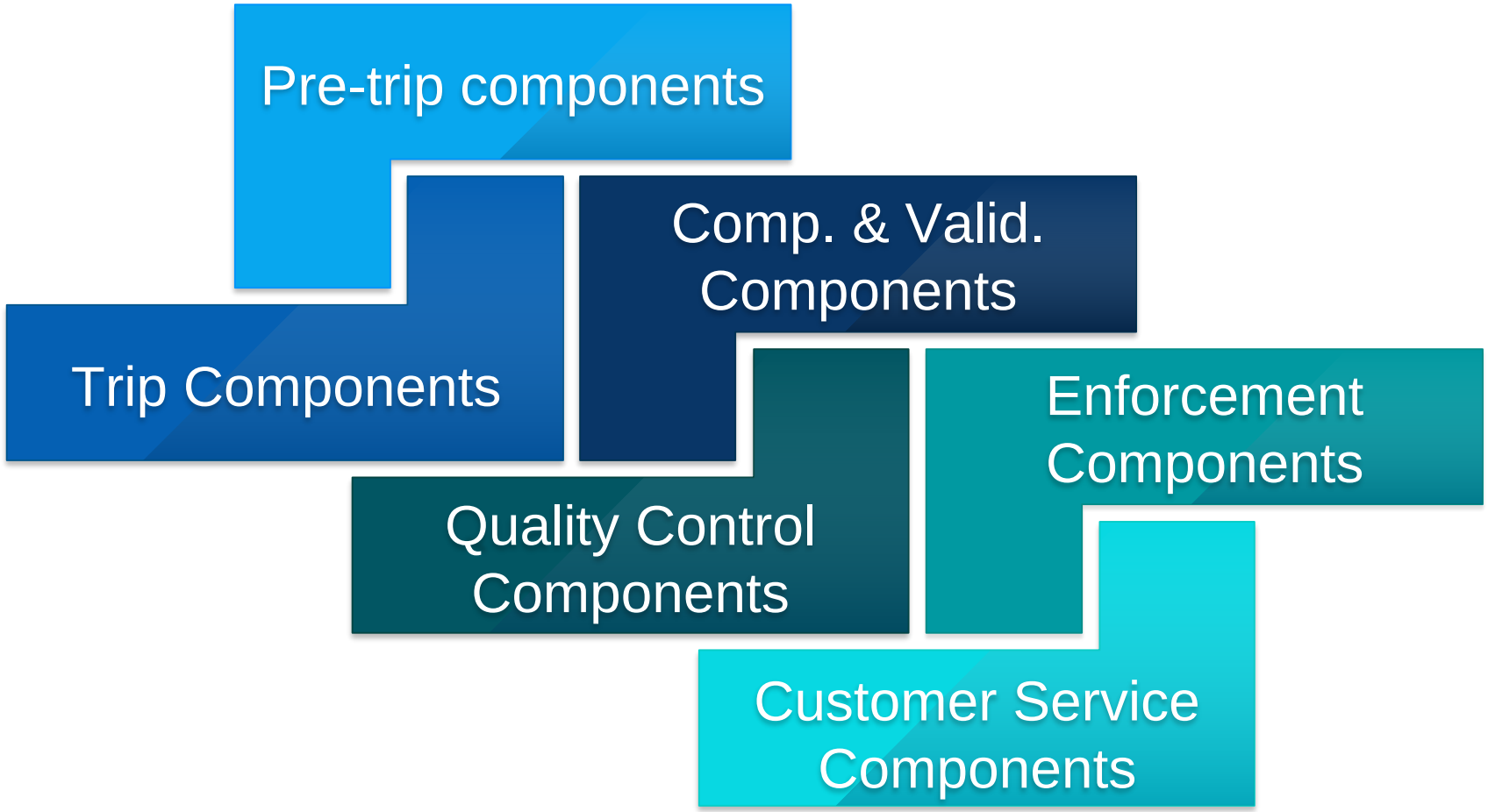
Stock Assessment Needs

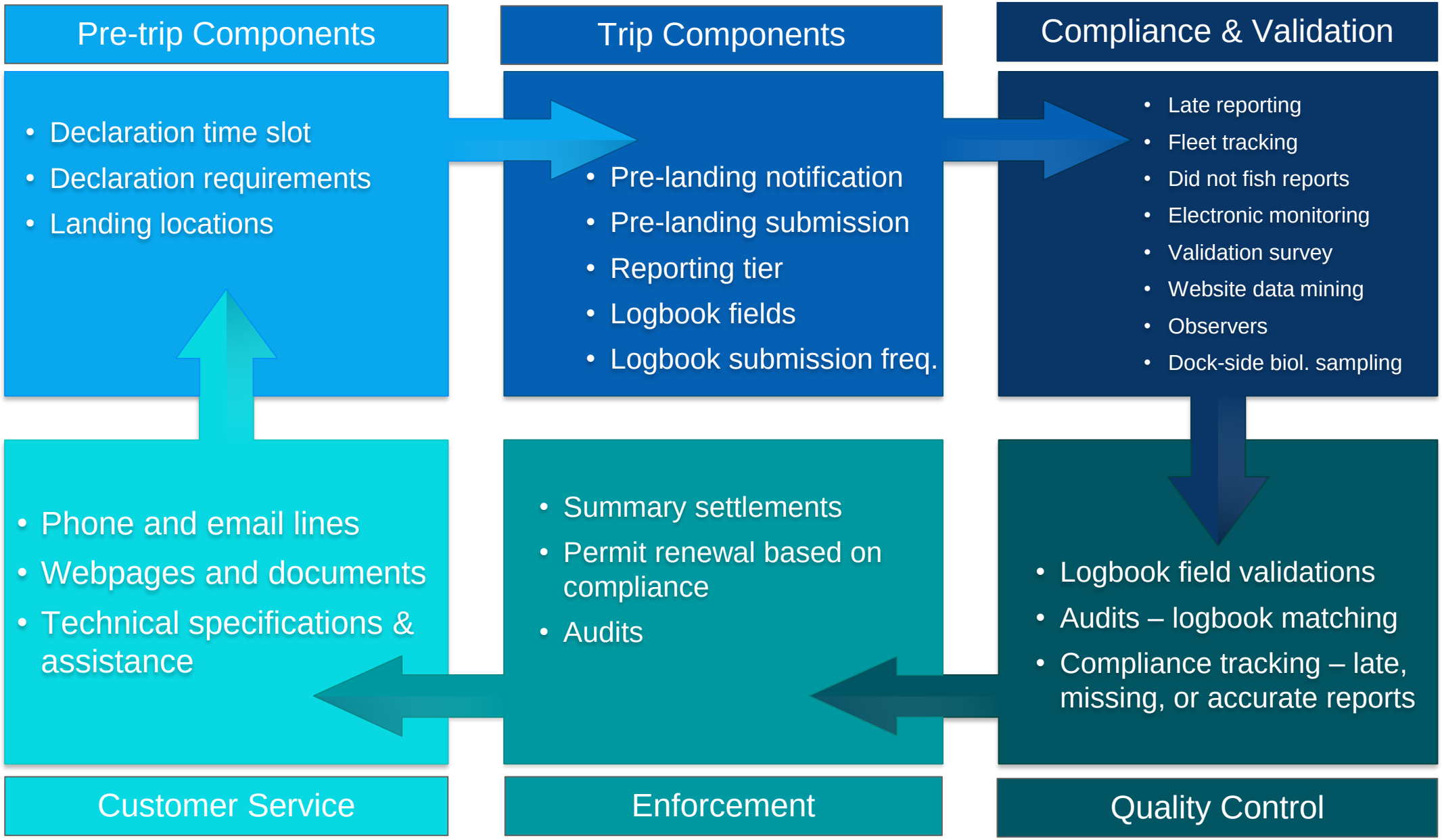
- Purpose
  - To examine the effects of fishing and other factors to describe the past and current status of a fish stock, answer questions about stock size, provide information to make sound decisions
- Data
  - Utilizes fishery-dependent and fishery-independent data
  - Catch, relative abundance, and biological data (life history)
  - Annual trends

Management Needs

- Purpose
  - To predict potential changes in management regulations (e.g. trip/bag limits, size limits, seasonal closures, etc.)
- Data
  - Fishery-dependent data sets
  - Requires fine-level temporal data (e.g., weeks, months, wave) for seasons, spatial data, and trip (or set) level data, catch per unit effort, and discard disposition for limitations
  - Target species required for economic analyses

Program Components




Pre-trip Components
Declaration time slot
Declaration requirements
Landing locations
Trip Components
Pre-landing notification
Pre-landing submission
Reporting tier
Logbook fields
Logbook submission freq.
Compliance & Validation
Late reporting
Fleet tracking
Did not fish reports
Electronic monitoring
Validation survey
Website data mining
Observers
Dock-side biol. sampling
Phone and email lines
Webpages and documents
Technical specifications & assistance
Summary settlements
Permit renewal based on compliance
Audits
Logbook field validations
Audits – logbook matching
Compliance tracking – late, missing, or accurate reports
Customer Service
Enforcement
Quality Control

Pre-trip components - Declaration

- Declaration benefits
  - When used with real-time distribution, allows enforcement officers and dockside samplers to plan work day schedule or intercept trips
  - Managers use declaration data to improve data quality, for trip accounting, and program reporting compliance audits.
- Declarations
  - Submitted prior to departure and closer declaration is to actual trip departure the more beneficial.
    - Example fisheries submission requirements: no more than 1 hour prior to departure, same day, no submission time frame
  - Include information about vessel, permit, sector, fishery, gear, and departure date/time.
  - Typically any fishing trip will require a declaration but some fisheries require declarations upon any at sea movement (e.g., dock to dock)

Pre-trip components – Landing Locations

- Landing location is where fish or passengers are offloaded.
  - Where a vessel is stored does not require a landing location.
  - Can be general (city, port, larger geographic area) or specific (address, marina slip)
- Often used with declarations, pre-landing notifications, and logbooks
- Assists with compliance and enforcement measures.
  - Provide location for enforcement and dockside samplers to intercept vessel for auditing or biological sampling.
- Assists with sampling frame designs for validation surveys
- Provides measure of spatial distribution for management actions
- Requires pre-approval for use in declarations, pre-landing notifications, and logbooks
  - Officer and dockside safety and access should be consider for approval

Trip Components

- Pre-landing Notification Benefits
  - Assists in monitor compliance and intercepting vessels at landing
  - Managers use this to improve data quality, post-trip accounting/auditing, and measuring program compliance
- Pre-landing notifications
  - Submitted in advance of landing, often requiring some satellite method of submission (e.g., VMS, satellite phone) or delay between submission and arrival at landing location
  - Includes information about the vessel, landing location, dealer (if applicable), estimated date/time arrival, and estimated landings
- Original SEFHIER program used a combination of a declaration (hail-out) and pre-landing notification (hail-in) instead of 2 separate components.

Trip Component - Logbooks

- Provides vessel level information about fishing activity, species caught, quantities of catch (landed and discarded), fishing effort and fishery value.
- Logbooks serve several purposes including: resource management, regulatory compliance, and informed decision-making.
  - Data can be used to predict biological, social, and economic effects of management changes
  - Monitor regulatory compliance and catch accountability
  - Depict fish spatial distributions and fishing activity hot spots useful for non-fishing activities (e.g., placement of wind farms)
  - Provide information for in-season management decisions when submitted in a timely manner with accurate data

Trip Component - Logbooks

- Logbook data collection can be trip level, gear level, or set level.
  - Trip level data provides cumulative catch and effort information, but lacks relevant spatial data for management.
  - Gear level data provides catch and effort information by gear used per trip. Useful when multiple gears are used per trip and provides additional information in relation to gear selectivity, gear target species, and areas fished.
  - Set level data provides information by the most fundamental unit of fishing activity.
    - Provides more granularity for precise information on CPUE, catch composition, discard mortality, depth and mortality, gear selectivity, and refine spatial data.
    - Set for hook and line gear is often a location where a gear is set, not information per each line in the water.

Trip Component - Logbooks

- Logbook submission affects the ability to use the data in management
  - Submission immediately after each trip is ideal, as decreases in submission increase reporting bias, decrease the ability to manage stocks in-season, and reduce validation and estimation methodologies.
  - Late submission are often not used for detailed management analyses.

Compliance and Validation Components

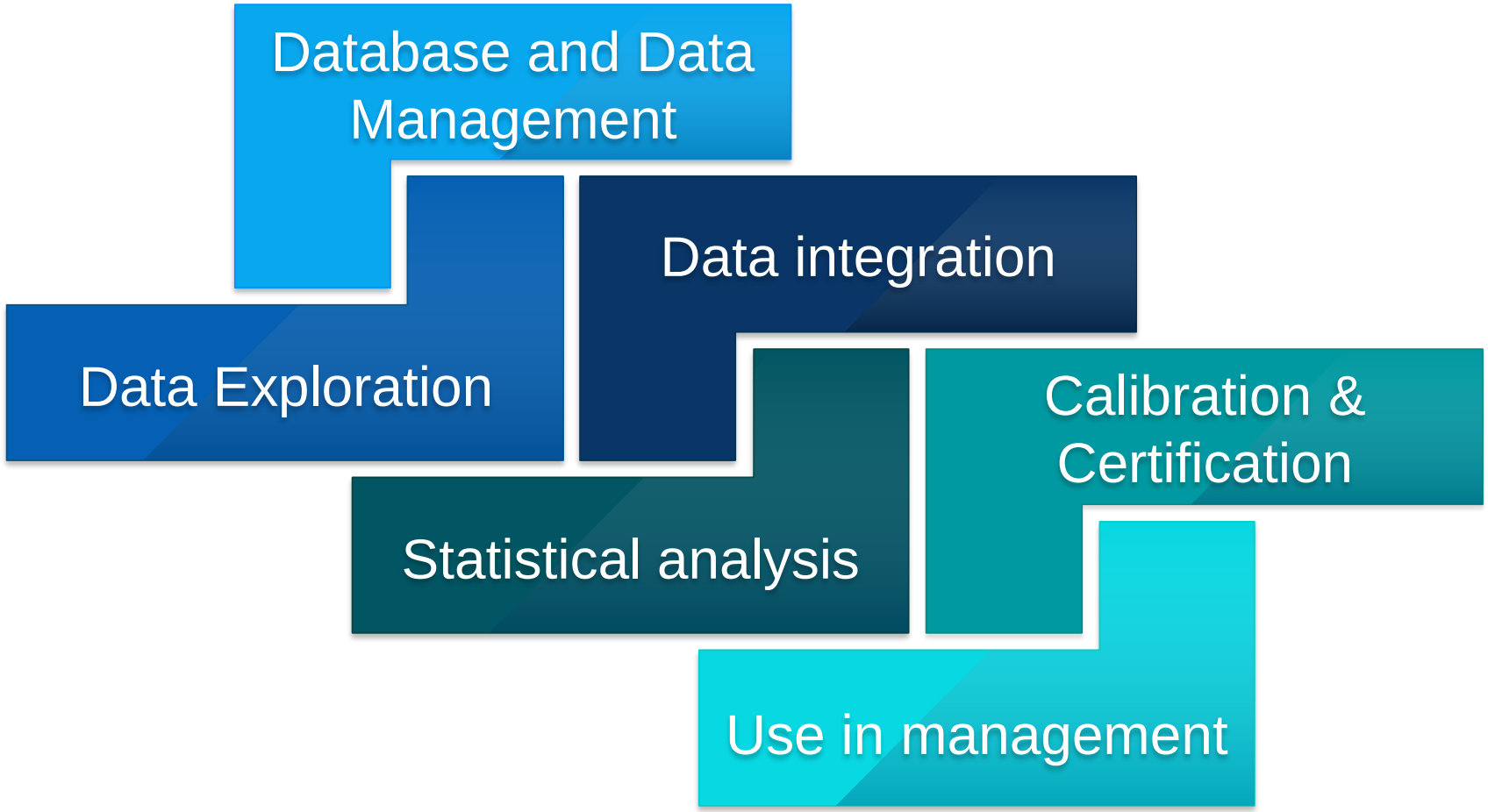
- Validation & compliance components are used together to ensure data accuracy
- Tools vary by survey and may apply to more than one aspect of program compliance

	Catch & Effort Estimation	Fishing Activity	Independent validation	Cross verification	Compliance deterrent	Biological samples
Validation survey	Yes	Yes	Yes		Indirect	Optional
Fleet monitoring	Indirect	Yes		Yes	Yes	
Declaration		Yes			Yes	
Pre-landing notification	Yes	Yes			Yes	
Did not fish reports	Yes	Yes				
Website mining				Yes		
Observers	Yes	Yes	Yes		Yes	Optional
Electronic monitoring	Yes	Yes	Yes		Yes	
Dockside sampling	Indirect	Yes	Yes			Yes
Enforcement option			Yes		Yes	

Validation and Compliance Component Costs

	Cost Fishermen	Cost Agency
Validation survey	Time for survey	$$$ (boots on the ground)
Fleet monitoring	$$	$
Declaration	Time	$
Pre-landing notification	Time	$
Did not fish reports	Time	$
Website mining	None	$$ (time and collation)
Observers	$ (displace crew or customer)	$$$ (boots on the ground)
Electronic monitoring	$$$ (equipment)	$$$ (infrastructure, review)
Dockside sampling	Time	$$$ (boots on the ground)
Enforcement option	$ (penalties, permit renewal delays)	$$

Analysis and Use Components



Balance Considerations

- Needs to balance fishermen burden and ability to monitor compliance via intercepts
  - Original SEFHIER program attempted to balance the needs by combining together the declaration and Pre-landing Notification into one report.
  - SEFHIER balanced burden of reporting with asking only for landed and discarded instead of discard disposition
  - Not including a Did Not Fish report or observer coverage due to VMS ability to validate

Questions?