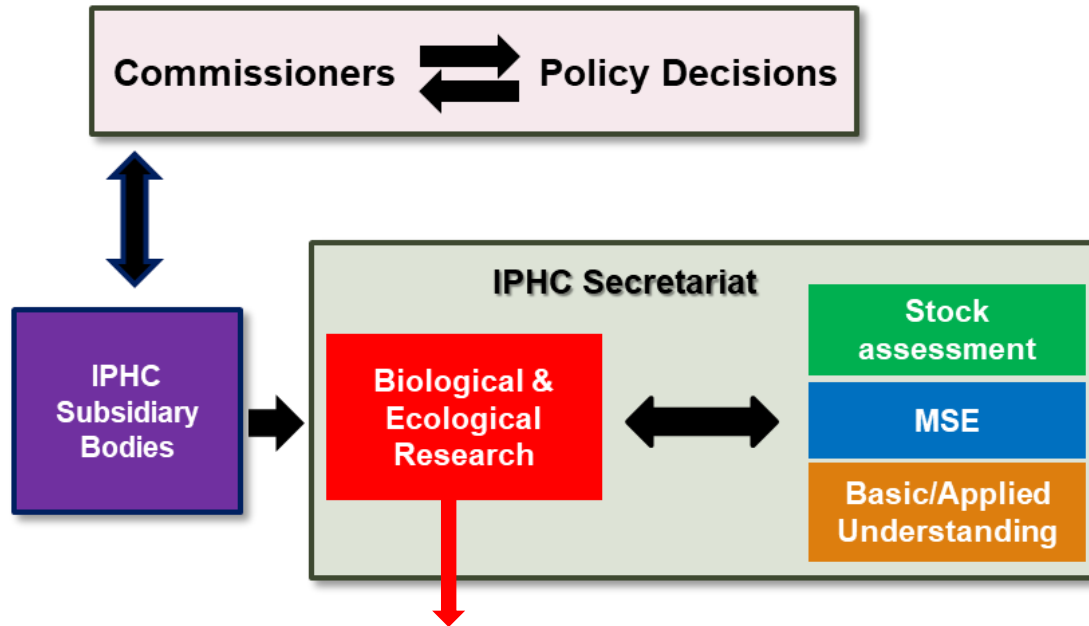


# Report on current and future Biological and Ecosystem Science Research activities

Agenda item: 9.1  
IPHC-2024-AM100-14  
(J. Planas)



# Biological and Ecosystem Science Research



## 5 Yr –Program of Integrated Research and Monitoring (2022-2026)

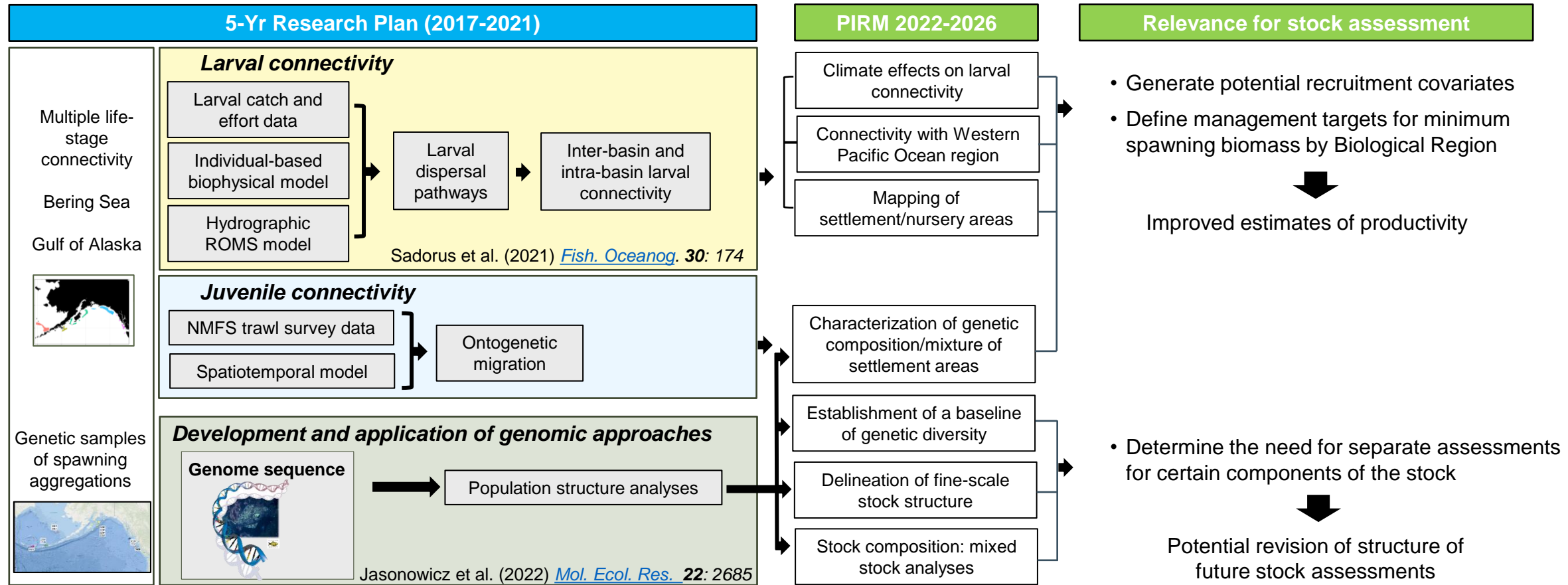
- Research Areas:
- Migration and Population Dynamics
  - Reproduction
  - Growth
  - Mortality and Survival Assessment
  - Fishing Technology

# 5-Year PIRM and management implications

## 5-Year Program of Integrated Research and Monitoring

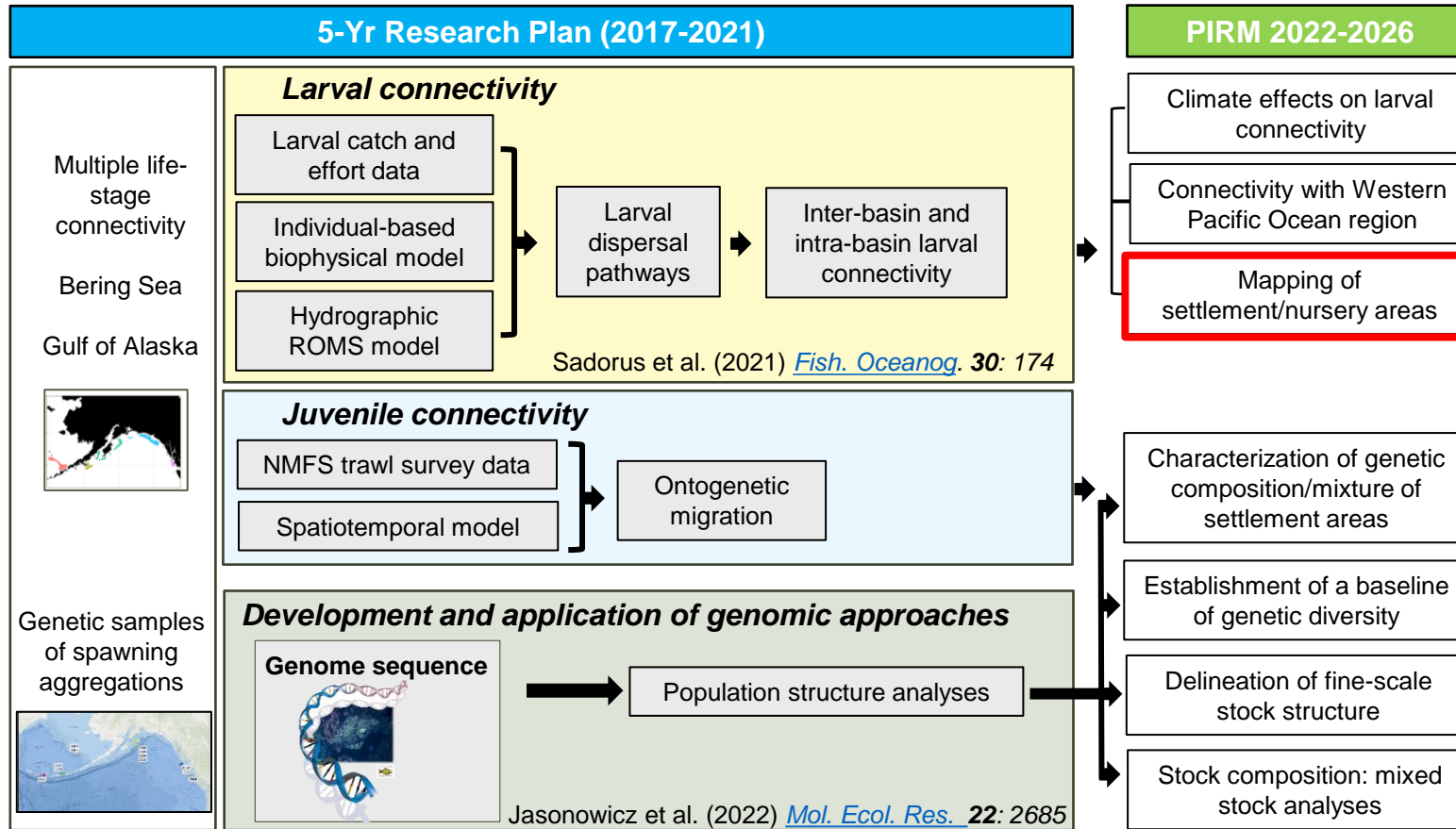
Primary Research Areas	Main Objectives	Management implications
Migration and population dynamics		
Reproduction		
Growth		
Mortality and survival assessment		
Fishing technology		

# 1. Migration and Population Dynamics

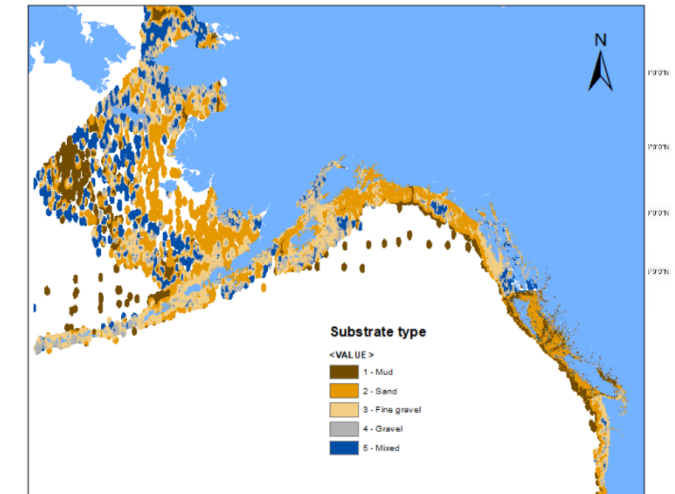




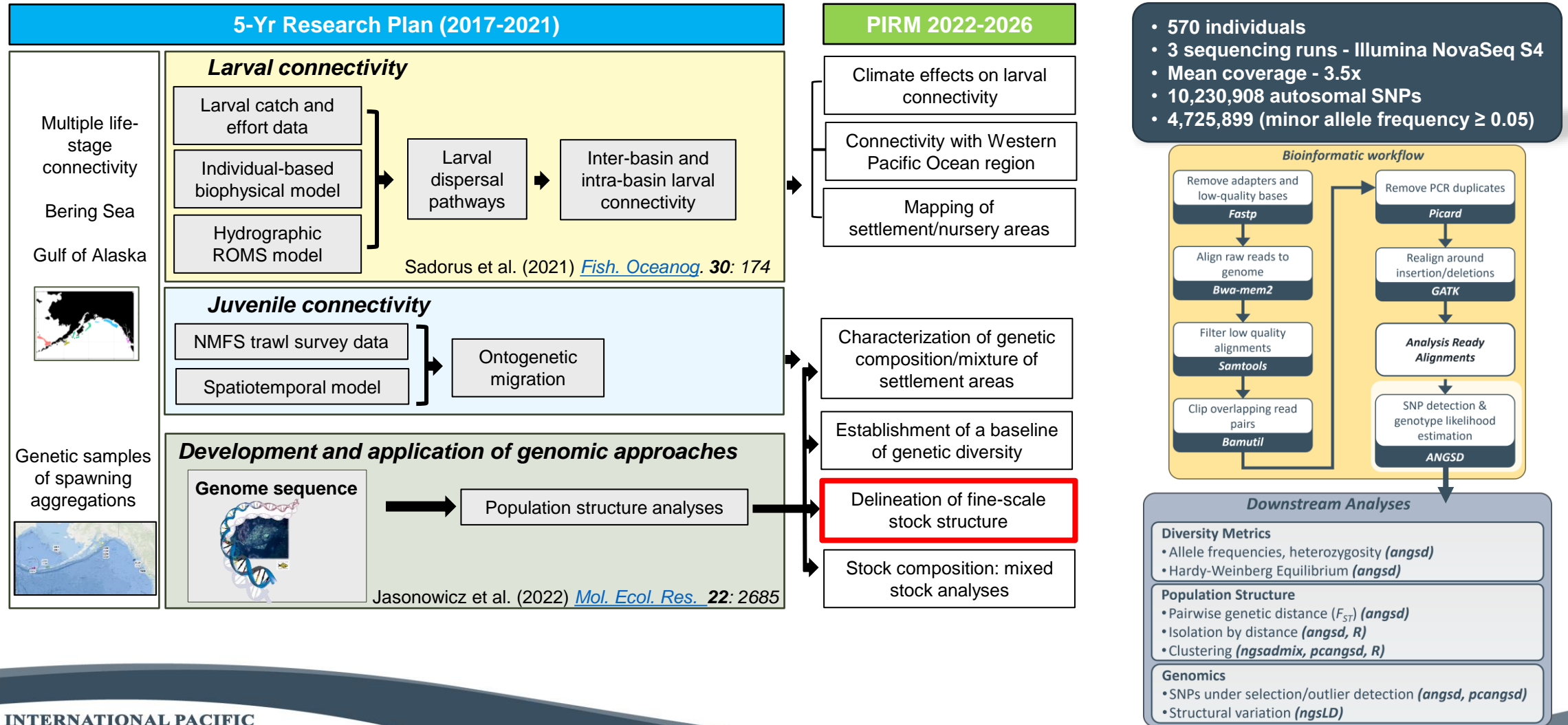
# 1. Migration and Population Dynamics



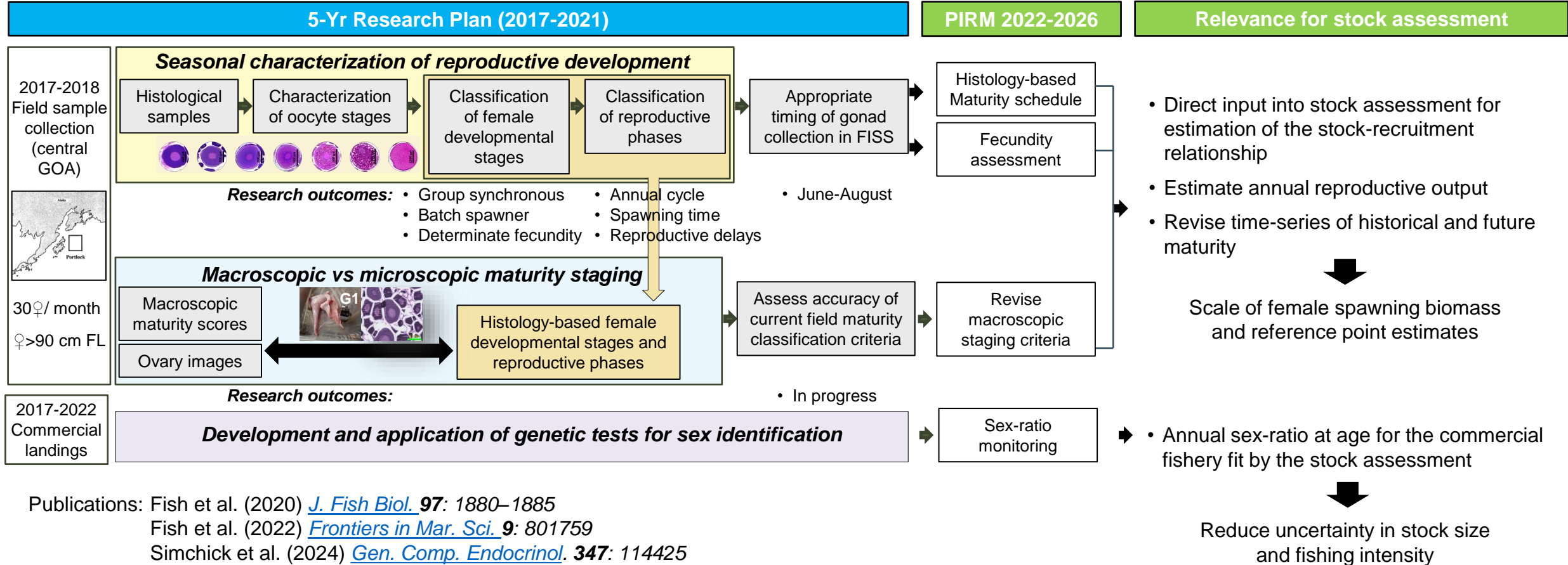
- Substrate information: usSeabed database.
- B.C. substrate layer 100-m resolution– provided by Dr. Dana Haggarty (DFO).
- Next step: bathymetry layer.



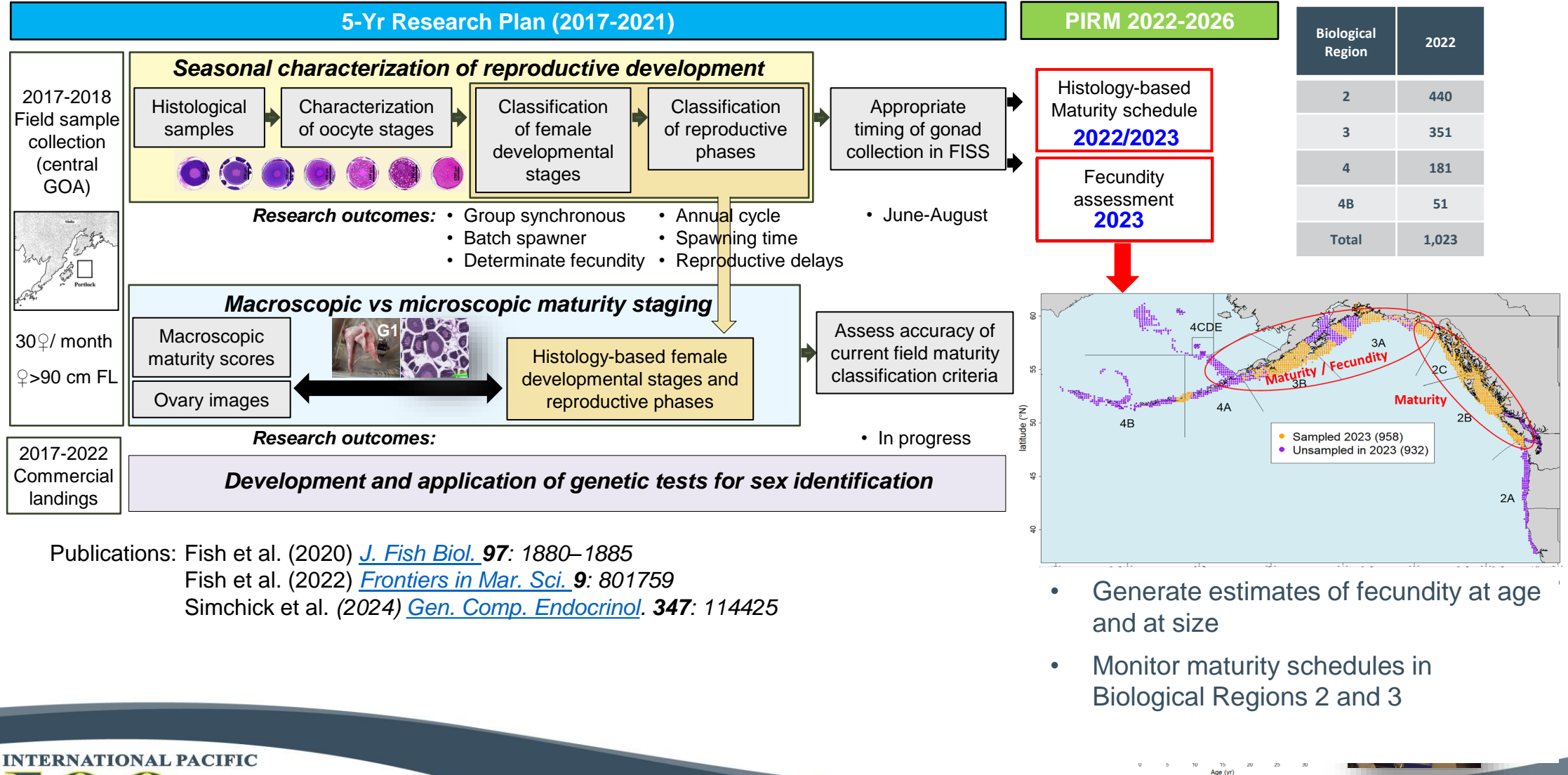
# 1. Migration and Population Dynamics



# 2. Reproduction



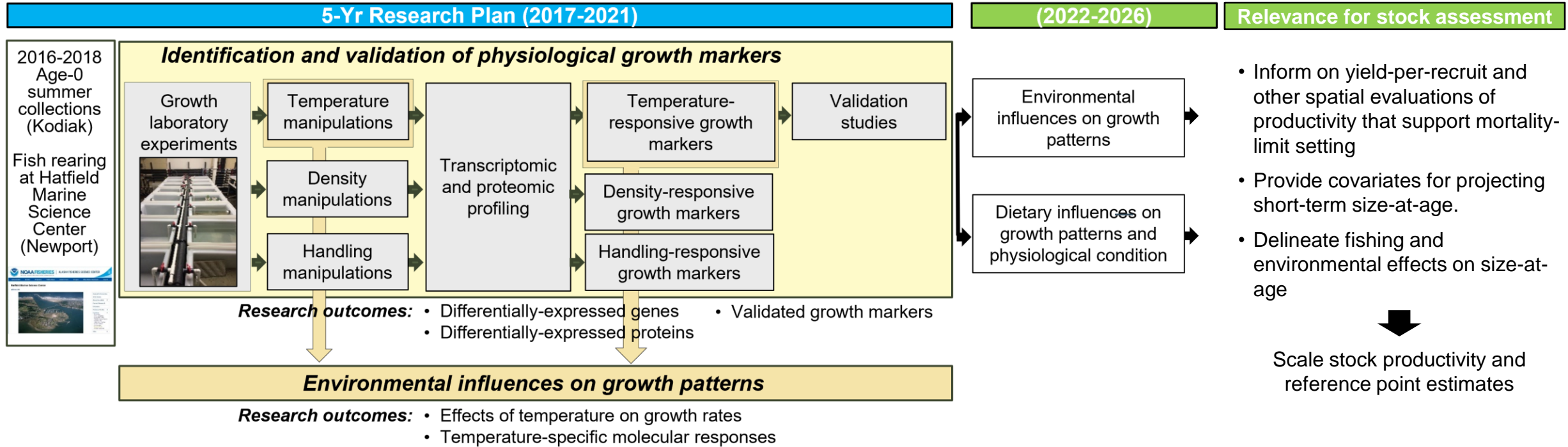
# 2. Reproduction



Publications: Fish et al. (2020) *J. Fish Biol.* **97**: 1880–1885  
 Fish et al. (2022) *Frontiers in Mar. Sci.* **9**: 801759  
 Simchick et al. (2024) *Gen. Comp. Endocrinol.* **347**: 114425



# 3. Growth



External collaborators: Behavioral Ecology Program at AFSC-NOAA (Newport, OR), Alaska Pacific University, UW

External funding: NPRB Grant#1704 (Sept. 2017-Feb. 2020)

Publications: Planas et al. (in preparation)

# 4. Mortality and Survival Assessment

## 5-Yr Research Plan (2017-2021)

PIRM 2022-2026

Relevance for stock assessment

Fall 2017  
field  
experiment  
(GOA)



### Discard mortality rate estimation: longline fishery

#### Capture and handling conditions

- Careful shake
- Gangion cut
- Hook strip

#### Injury and viability assessment

#### Physiological condition assessment

#### Analysis of capture-related variables

#### Survival assessment by tagging

#### Research outcomes:

- Injury and viability profiles of hook release methods
- Physiological profile of fish under different capture and handling conditions
- Longline DMR

#### Best handling practices in longline fishery

Summer  
2021 field  
experiments  
(Sitka, AK  
Seward, AK)

### Discard mortality rate estimation: charter recreational fishery

#### Capture and handling conditions

- 12/0 and 16/0 hooks

#### Injury, viability and physiological assessment

#### Survival assessment by tagging

#### Analysis of capture-related variables

#### Research outcomes:

- Recreational DMR

#### Best handling practices in recreational fishery

- Improved estimates of discard mortality
- Reduce potential bias in stock assessment results and management of mortality limits

Reduce unobserved mortality and its effect on stock assessment

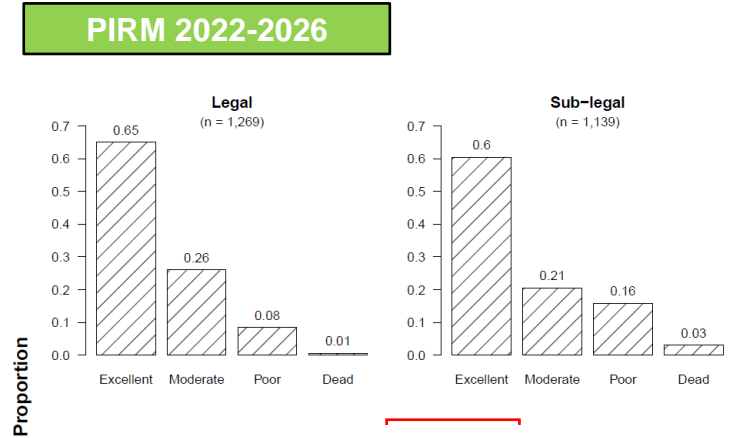
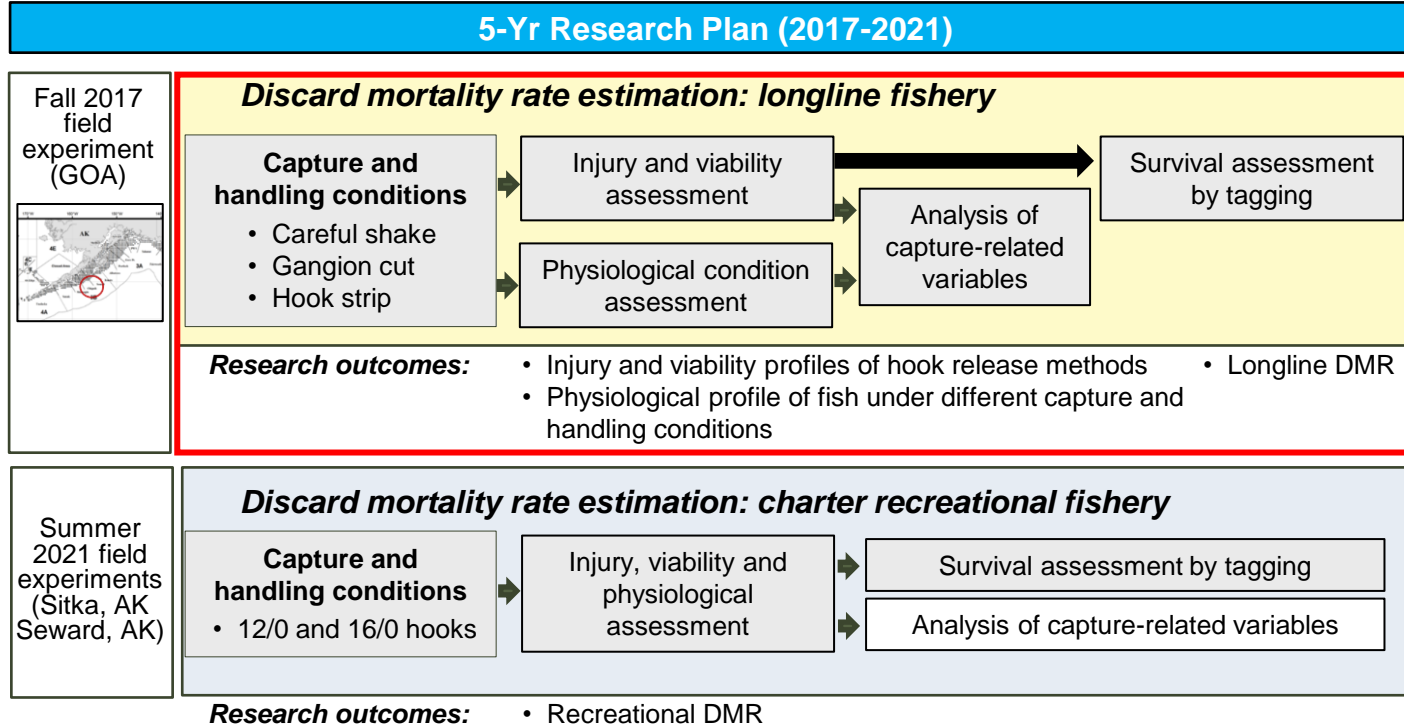
External funding: Saltonstall-Kennedy NOAA (2017-2020); NFWF (2019-2021); NPRB#2009 (2021-2022)

Publications: Kroska et al. (2021) [Conservation Physiology](#) **9**: coab001

Loher et al. (2022) [North American Journal of Fisheries Management](#) **42**: 37-49

Dykstra et al. (2024) [Ocean & Coastal Management](#). In Press.

# 4. Mortality and Survival Assessment



▼  
**Min. DMR = 4.2%**

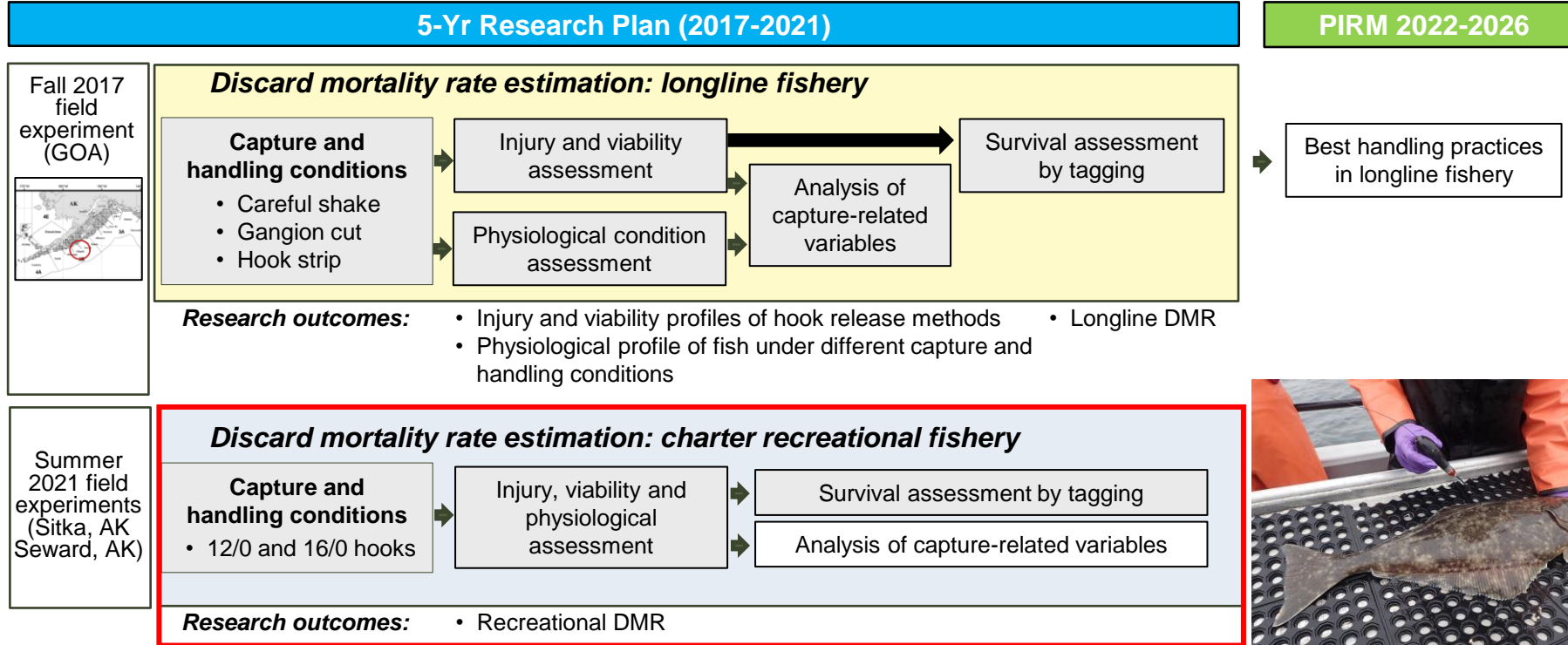
External funding: Saltonstall-Kennedy NOAA (2017-2020); NFWF (2019-2021); NPRB#2009 (2021-2022)

Publications: Kroska et al. (2021) [Conservation Physiology](#) **9**: coab001

Loher et al. (2022) [North American Journal of Fisheries Management](#) **42**: 37-49

Dykstra et al. (2024) [Ocean & Coastal Management](#). In Press.

# 4. Mortality and Survival Assessment



**Charter Recreational Fishery**

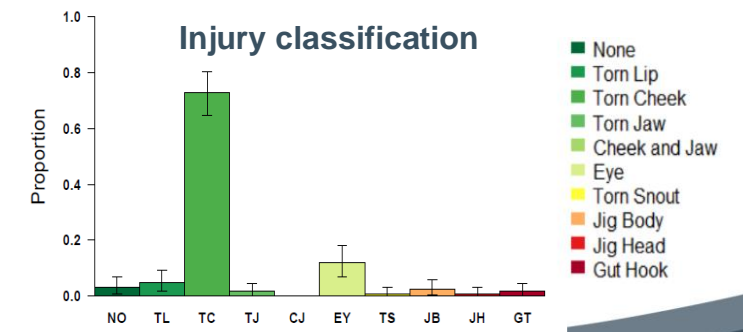
**Min. DMR: 1.35%  
(Excellent viability)**

External funding: Saltonstall-Kennedy NOAA (2017-2020); NFWF (2019-2021); NPRB#2009 (2021-2022)

Publications: Kroska et al. (2021) [Conservation Physiology](#) **9**: coab001

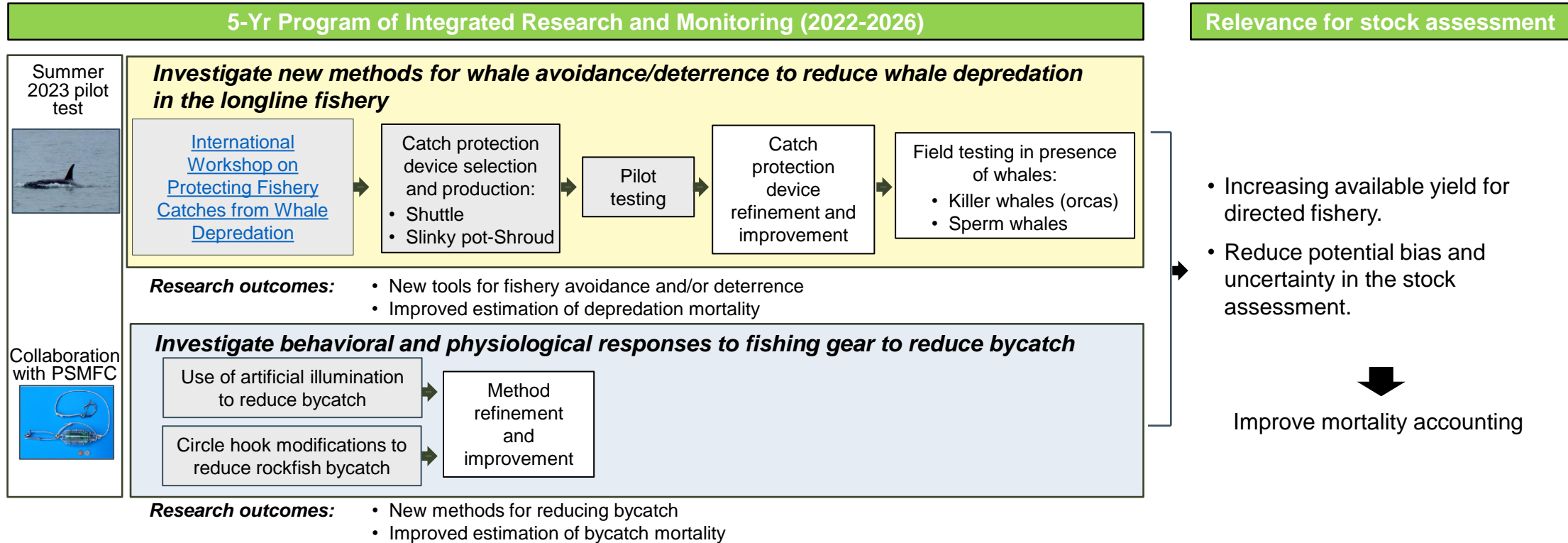
Loher et al. (2022) [North American Journal of Fisheries Management](#) **42**: 37-49

Dykstra et al. (2024) [Ocean & Coastal Management](#). In Press.





# 5. Fishing technology



External funding: Bycatch Reduction Engineering Program NOAA NA21NMF4720534 (2021-2023), NA23NMF4720414 (2023-2025)

Publications: Lomeli et al. (2021) [Fisheries Research](#) **233**: 105737

Lomeli et al. (2023) [Ocean & Coastal Management](#) **241**: 106664

# 5. Fishing technology

## 5-Yr Program of Integrated Research and Monitoring (2022-2026)

Summer  
2023 pilot  
test



### ***Investigate new methods for whale avoidance/deterrence to reduce whale depredation in the longline fishery***

[International Workshop on Protecting Fishery Catches from Whale Depredation](#)

Catch protection device selection and production:

- Shuttle
- Slinky pot-Shroud

Pilot testing

Catch protection device refinement and improvement

Field testing in presence of whales:

- Killer whales (orcas)
- Sperm whales

**Research outcomes:**

- New tools for fishery avoidance and/or deterrence
- Improved estimation of depredation mortality

Collaboration with PSMFC



### ***Investigate behavioral and physiological responses to fishing gear to reduce bycatch***

Use of artificial illumination to reduce bycatch

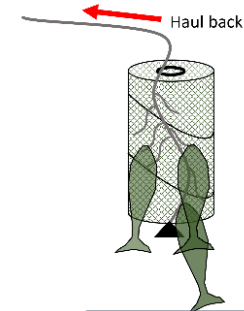
Circle hook modifications to reduce rockfish bycatch

Method refinement and improvement

**Research outcomes:**

- New methods for reducing bycatch
- Improved estimation of bycatch mortality

Shroud



External funding: Bycatch Reduction Engineering Program NOAA NA21NMF4720534 (2021-2023), NA23NMF4720414 (2023-2025)

Publications: Lomeli et al. (2021) [Fisheries Research](#) **233**: 105737

Lomeli et al. (2023) [Ocean & Coastal Management](#) **241**: 106664

# Summary of awarded research grants to IPHC current in 2024

Project #	Grant agency	Project name	PI	Partners	IPHC Budget (\$US)	Management implications	Grant period
1	North Pacific Research Board	Pacific halibut population genomics (NPRB Award No. 2110)	IPHC	Alaska Fisheries Science Center-NOAA	\$193,685	Stock structure	February 2022 – February 2024
2	Bycatch Reduction Engineering Program-NOAA	Full scale testing of devices to minimize whale depredation in longline fisheries (NOAA Award Number NA23NMF4720414)	IPHC	Alaska Fisheries Science Center-NOAA	\$199,870	Mortality estimations due to whale depredation	November 2023 – April 2025
Total awarded (\$)					\$393,555		

INTERNATIONAL PACIFIC  
**100** years  
HALIBUT COMMISSION