

INTERNATIONAL PACIFIC



HALIBUT COMMISSION

Report on Current and Future Biological and Ecosystem Science Research Activities

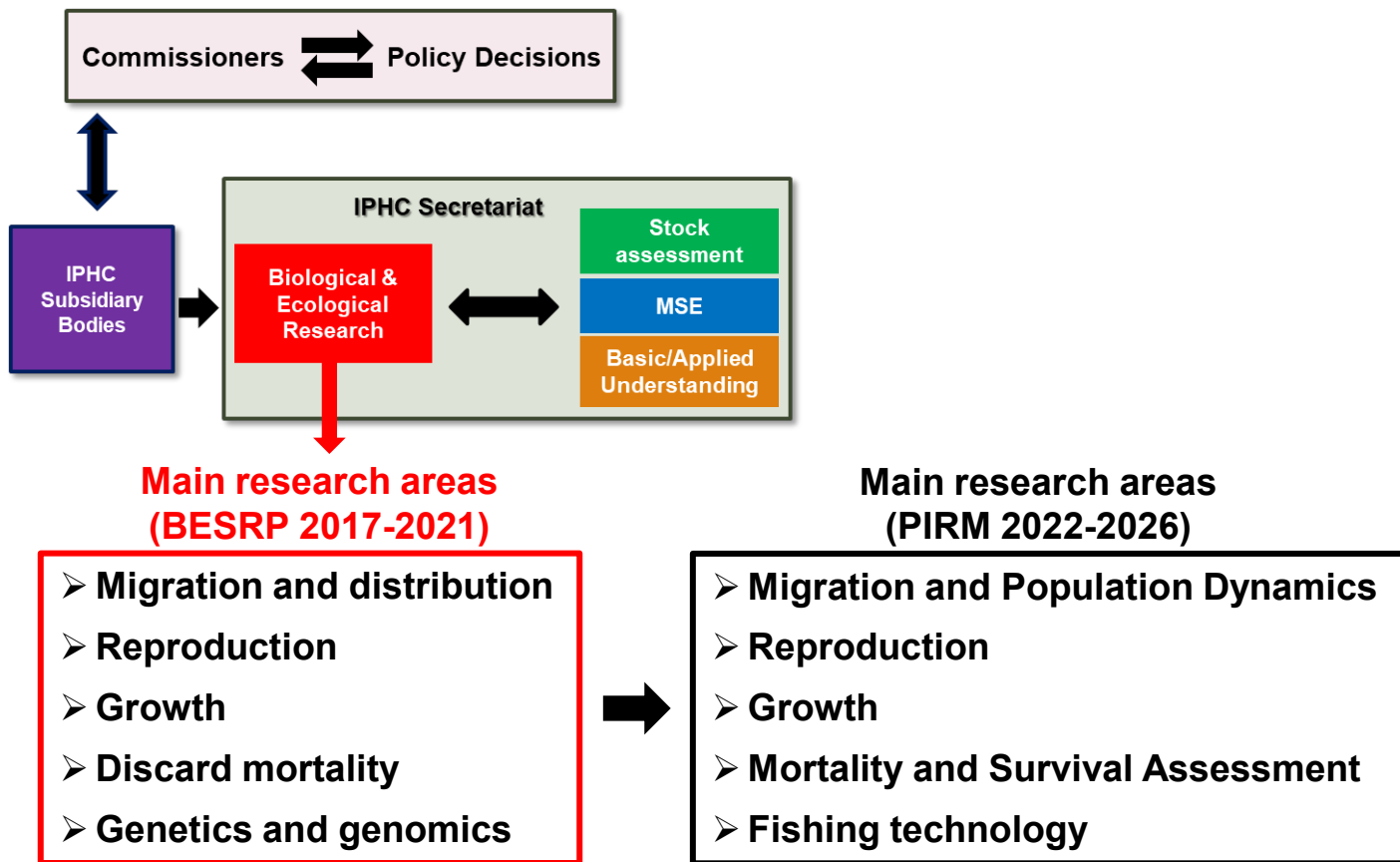
Agenda Item 6.1

IPHC-2023-AM099-12

(J. Planas)



Biological and Ecosystem Sciences



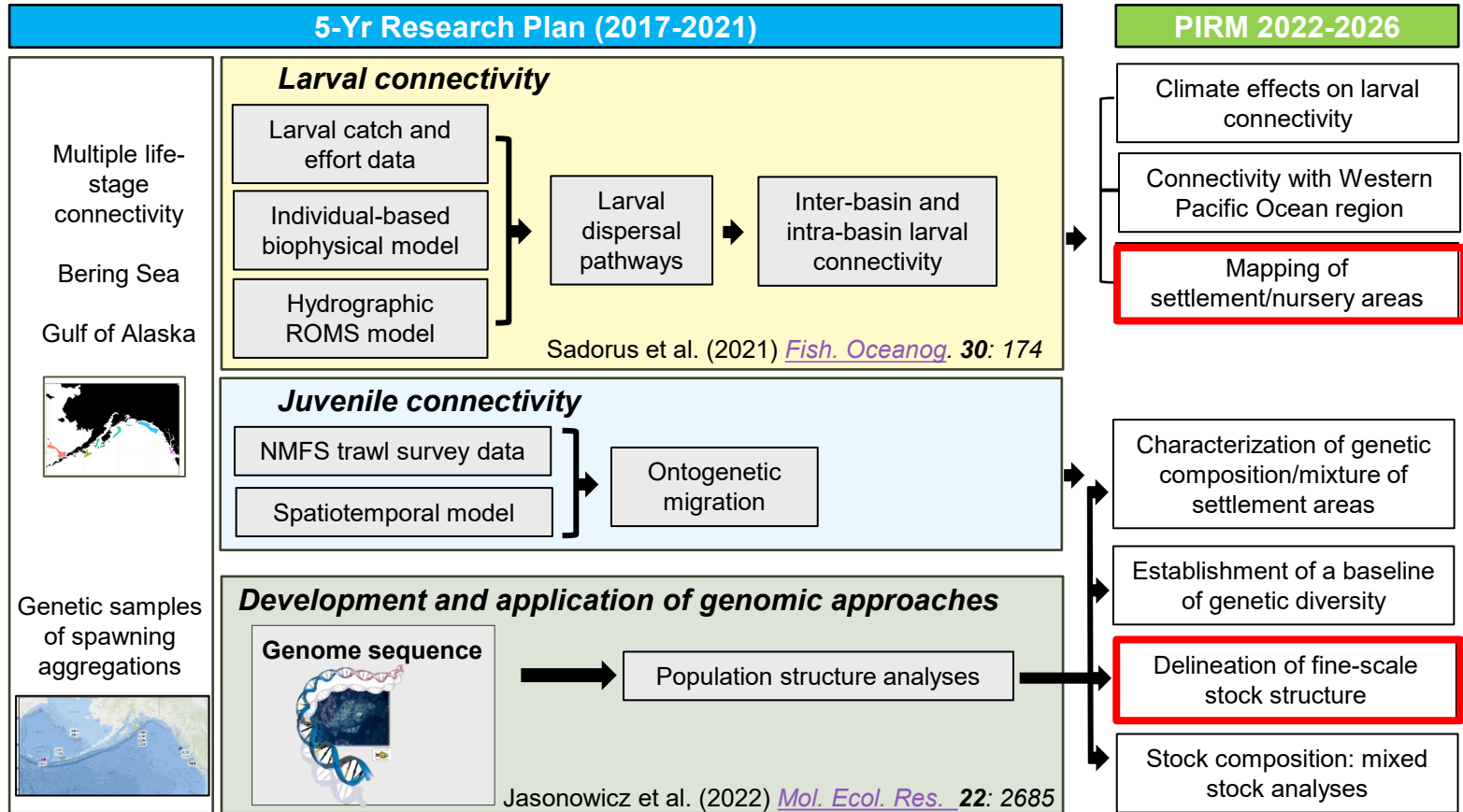
5Y-PIRM and management implications

5-Year Five-Year Program of Integrated Research and Monitoring

<i>Primary Research Areas</i>	<i>Main Objectives</i>	<i>Management implications</i>
Migration and Population Dynamics		
Reproduction		
Growth		
Mortality and Survival Assessment		
Fishing Technology		



1. Migration and Population Dynamics



1. Migration and Population Dynamics

Population Genomics

Objective: to resolve the genetic structure of the Pacific halibut stock in Convention Waters

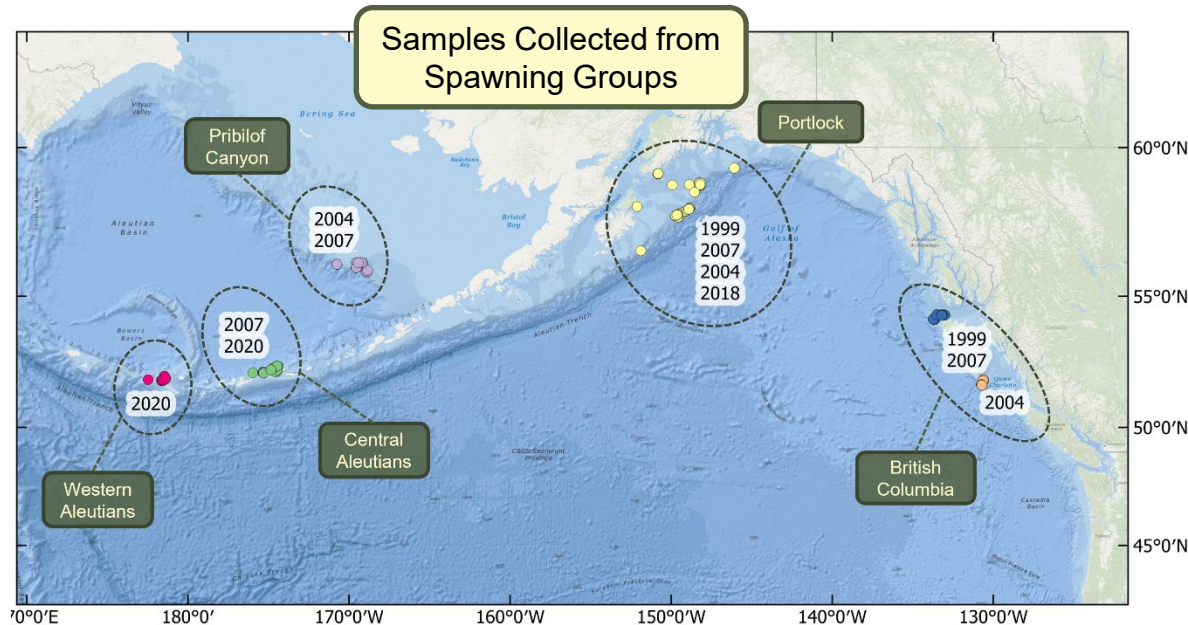


NPRB Project 2110 (2022-2024)

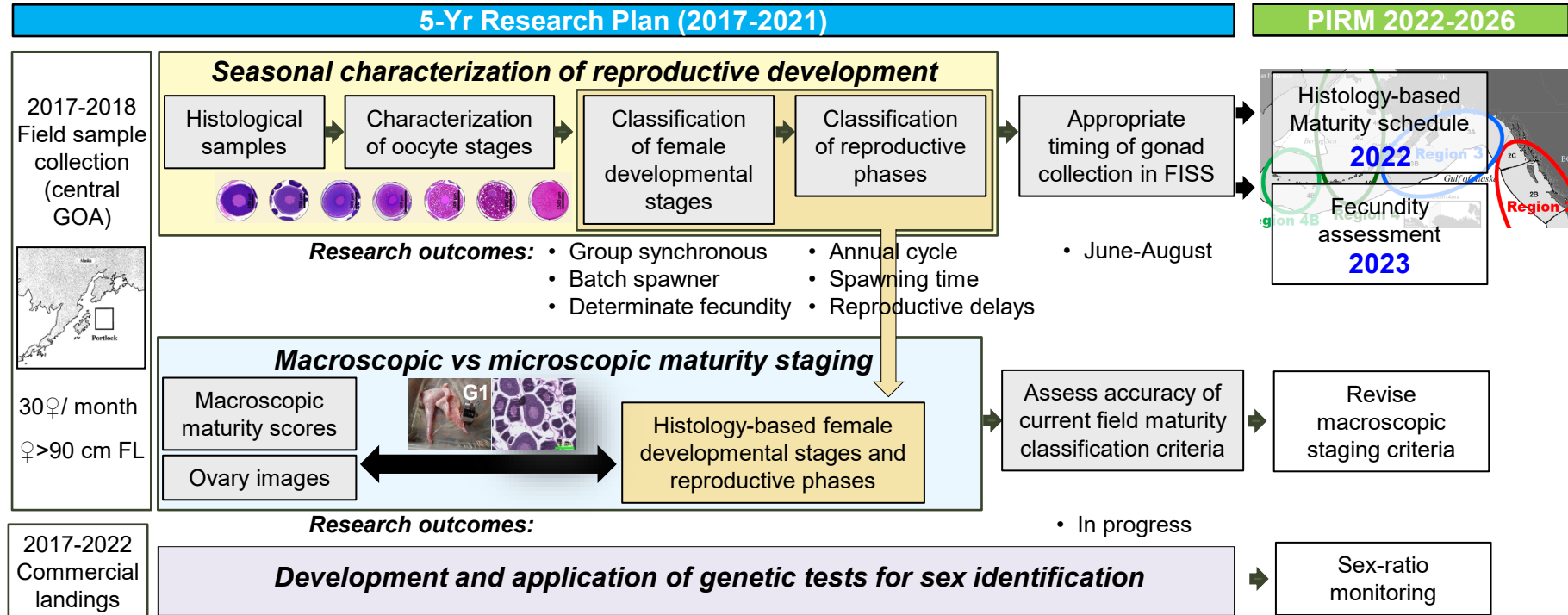
- **Low-coverage whole-genome resequencing (IcWGR)**
- Allows for screening genomic variation at very high resolution

Pacific Halibut Genome

- Version 2 – March 2022
- Identify potential local and/or environmental adaptations.
- Provide genetic basis for life-history traits (e.g. growth, maturity, migratory behavior, etc.).
- Establish Genetic Baseline



2. Reproduction



Publications: Fish et al. (2020) [Journal of Fish Biology](#) **97**: 1880–1885

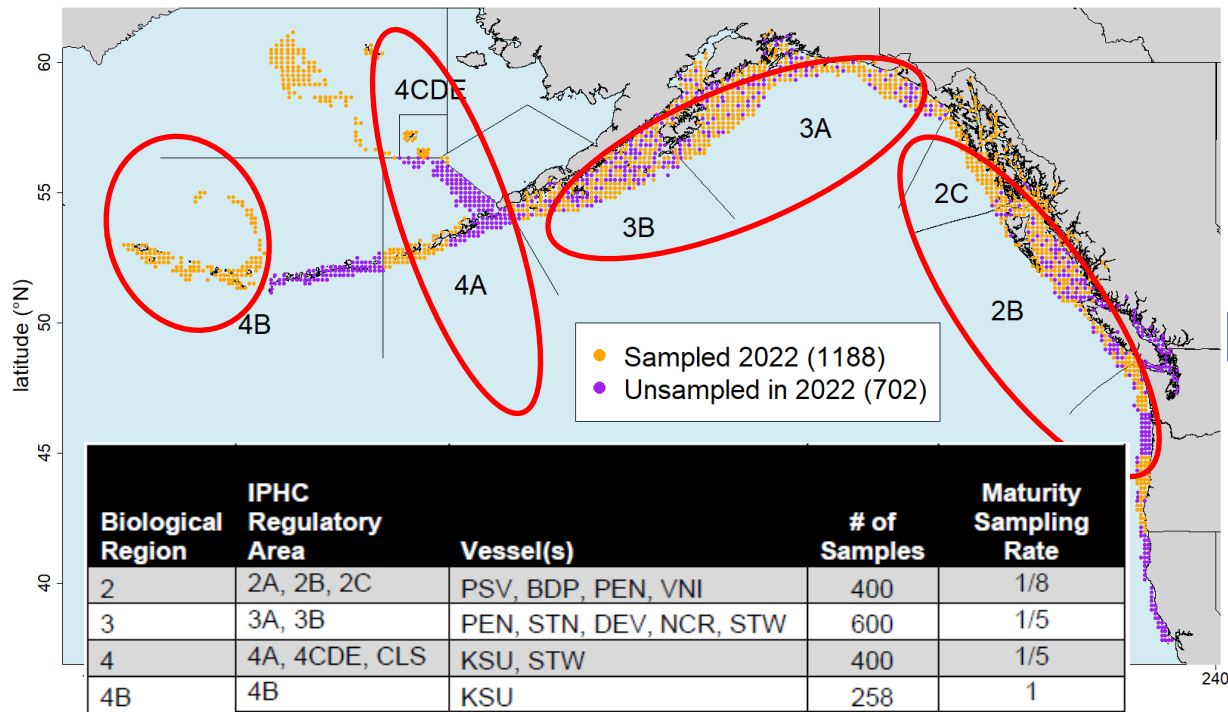
Fish et al. (2022) [Frontiers in Marine Science](#) **9**: 801759



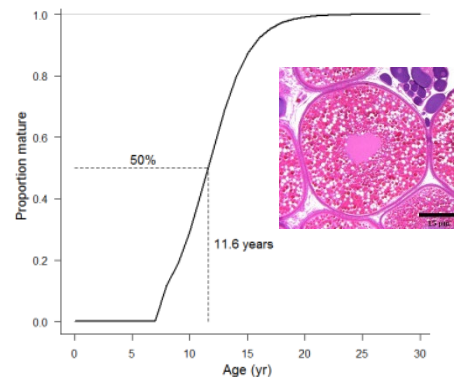
2. Reproduction

Update of maturity schedules

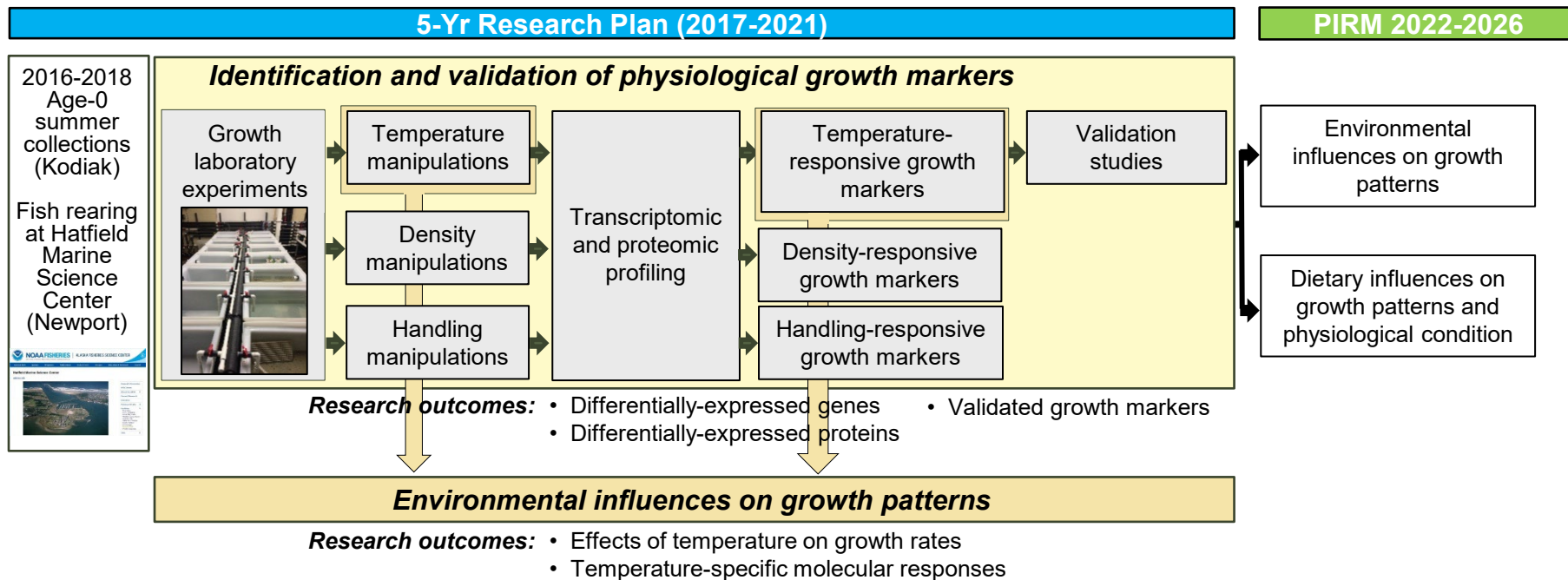
Objective: Generate accurate histology-based maturity schedules



- Maturity estimates per biological region by histological staging



3. Growth

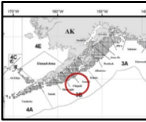


4. Mortality and Survival Assessment

5-Yr Research Plan (2017-2021)

PIRM 2022-2026

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

Best handling practices
in longline fishery

Research outcomes:

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

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

Best handling practices
in recreational fishery

Research outcomes:

- Recreational DMR

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



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IPHC

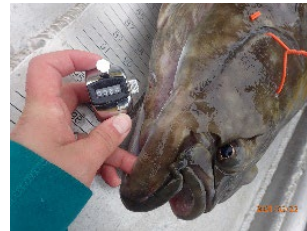
Slide 9

4. Mortality and Survival Assessment

Discard mortality rates in the Pacific halibut charter fishery

Objectives:

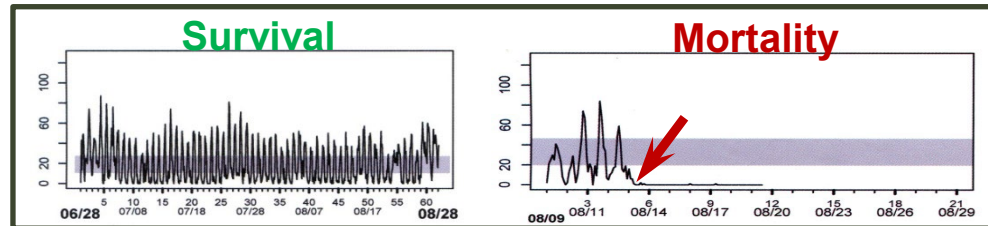
- Conduct experimental fishing in which Pacific halibut are subjected to typical recreational gear and handling practices to:
 - ✓ Investigate relationships between hook size and catch size
 - ✓ Develop injury and physiological stress profiles
 - ✓ Quantify and characterize survival by tagging



4. Mortality and Survival Assessment

Direct discard mortality rate estimation by tagging

- Tag types
 - Wire = 281 (all viabilities) – 28 recovered to date
 - sPAT = 80 (**only** on Excellent viability) – 76 provided functional data
 - 48 full duration (96 days)
 - 7 fishery recoveries
 - 21 premature release,
 - *Mortality rate estimate*: 1.35% (95% CI of 0.00-3.95% for Excellent viability fish)



5. Fishing technology

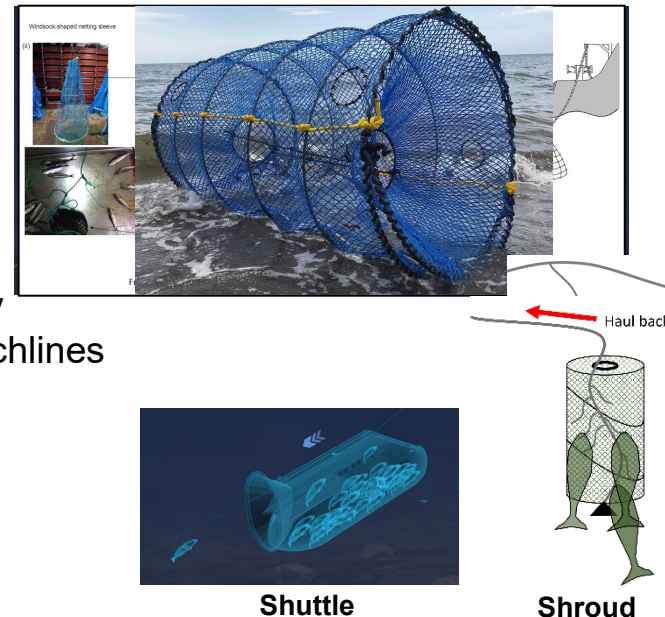
Reducing whale depredation by protecting longline catches

1. International Workshop on Protecting Fishery Catches from Whale Depredation (9 Feb. 2022):

- Virtual workshop - 74 participants from 6 countries
- 3 presentations on different strategies for protecting the catch from longlines:
 - Shuttles – Sago Solutions (Norway),
 - Shrouds – INFREMER, IRD, MARBEC, (France)
 - Slinky Pots – Cod Coil (US)

2. Field testing of catch protection devices

- Production of prototypes of two different devices:
 - Reduced size Sago Extreme shuttle with modified entry
 - Open end slinky pots over easy slip snap gear on branchlines
- Field testing (Spring of 2023 in Gulf of Alaska):
 - Deployment / Retrieval logistics
 - Optimal configurations (weighting, attachments)
 - Basic performance (species/sizes)



Externally-funded collaborative research

Project #	Grant agency	Project name	PI	Partners	IPHC Budget (\$US)	Management implications	Grant period
1	National Fish & Wildlife Foundation	Improving the characterization of discard mortality of Pacific halibut in the recreational fisheries (NFWF Award No. 61484)	IPHC	Alaska Pacific University, University of Alaska Fairbanks, charter industry	\$98,902	Bycatch estimates	1 April 2019 – 1 November 2021
2	North Pacific Research Board	Pacific halibut discard mortality rates (NPRB Award No. 2009)	IPHC	Alaska Pacific University	\$210,502	Bycatch estimates	1 January 2021 – 31 March 2022
3	Bycatch Reduction Engineering Program-NOAA	Gear-based approaches to catch protection as a means for minimizing whale depredation in longline fisheries (NOAA Award Number NA21NMF4720534)	IPHC	Deep Sea Fishermen's Union, Alaska Fisheries Science Center-NOAA, industry representatives	\$99,700	Whale depredation	1 November 2021 – 31 October 2023
4	North Pacific Research Board	Pacific halibut population genomics (NPRB Award No. 2110)	IPHC	Alaska Fisheries Science Center-NOAA	\$193,685	Stock structure	1 December 2021 – 31 January 2024
Total awarded (\$)					\$602,789		

Current

Current



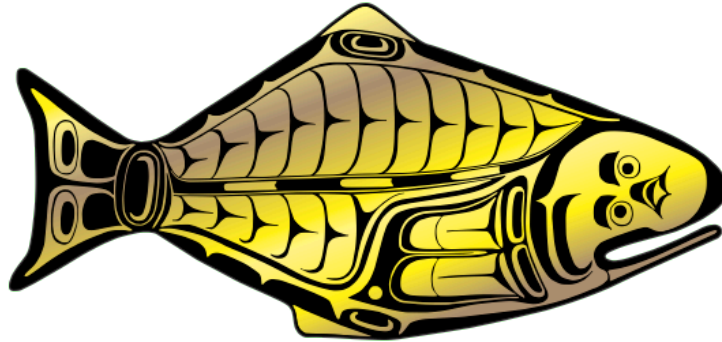
Recommendations

That the Commission:

- a) **NOTE** paper IPHC-2023-AM099-12 that provided a description of the biological and ecosystem science research projects conducted and planned by the IPHC Secretariat and contemplated within the Five-year Program of Integrated Research and Monitoring (2022-2026).
- b) **PROVIDE** any redirection or suggestions on the various research streams covered by the IPHC mandate.



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