Columbia Basin Collaborative Science Integration Work Group

November 7, 2022

Zoom Webinar Features

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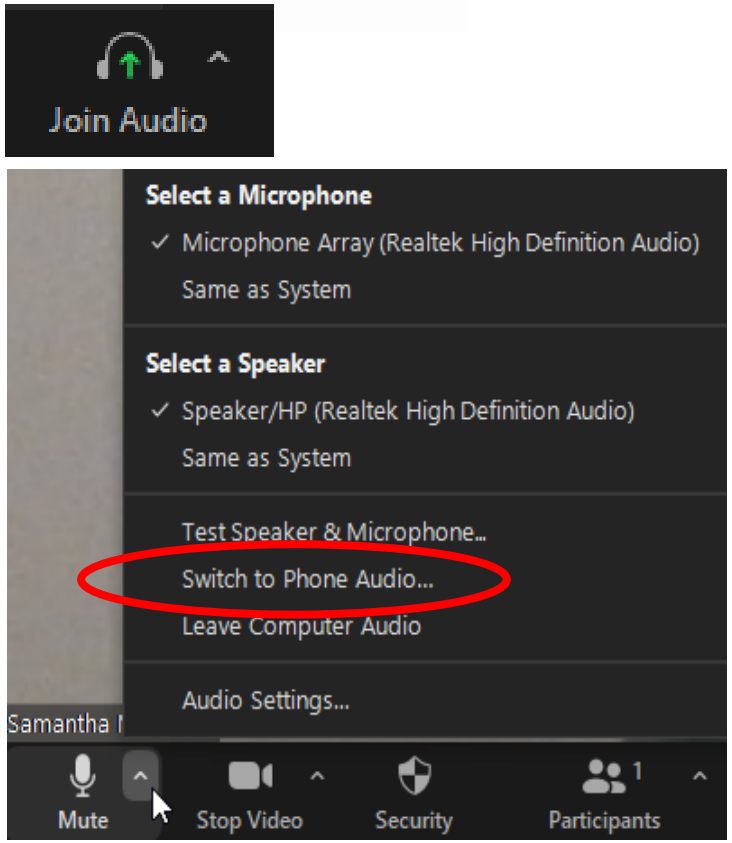

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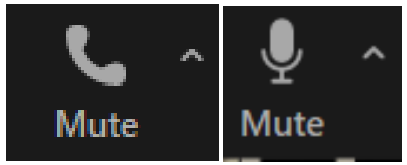
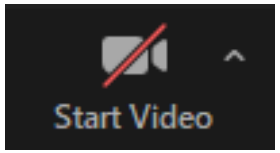
Zoom Webinar Features

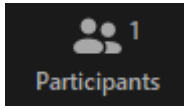
Keep yourself on mute when not speaking.

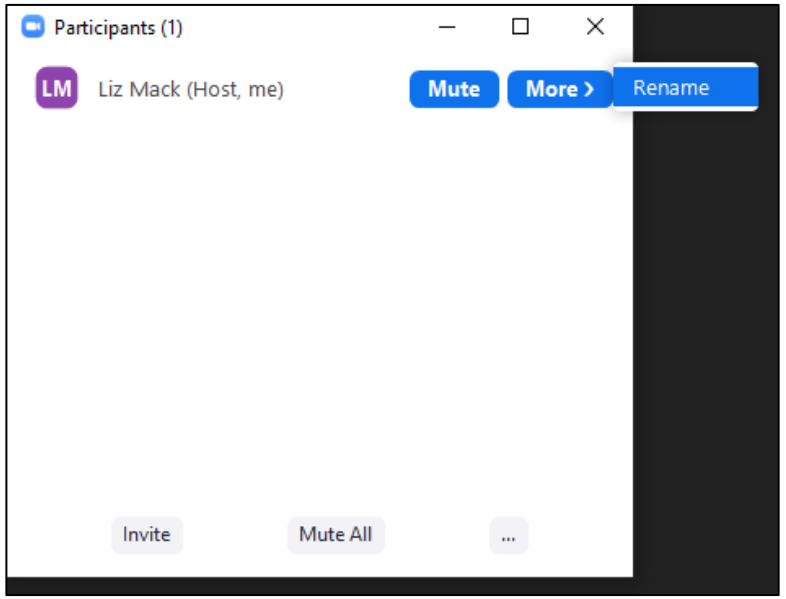


Use video, if possible, to promote face to face communication.



If needed **rename yourself** in the participant panel.





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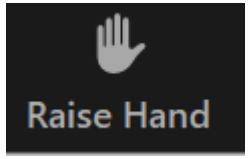

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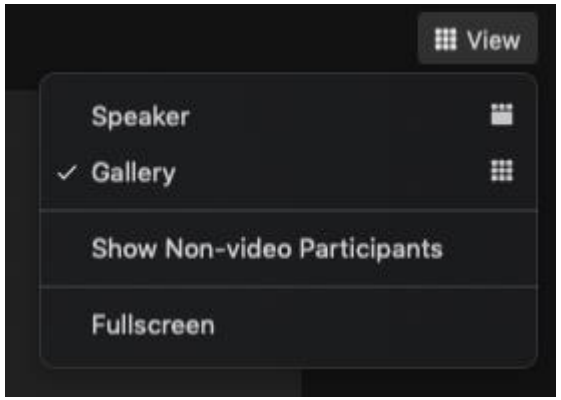
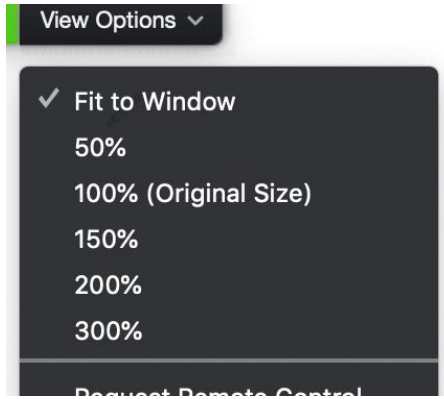
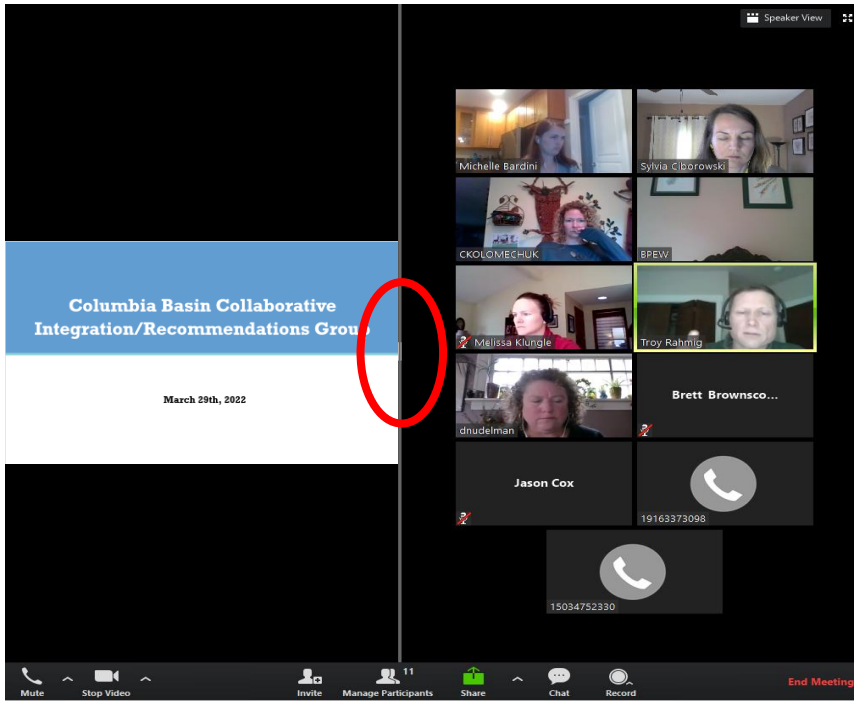
Adjust view options







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Welcome, Opening Remarks, and Proposed Agenda

Meeting Guidelines

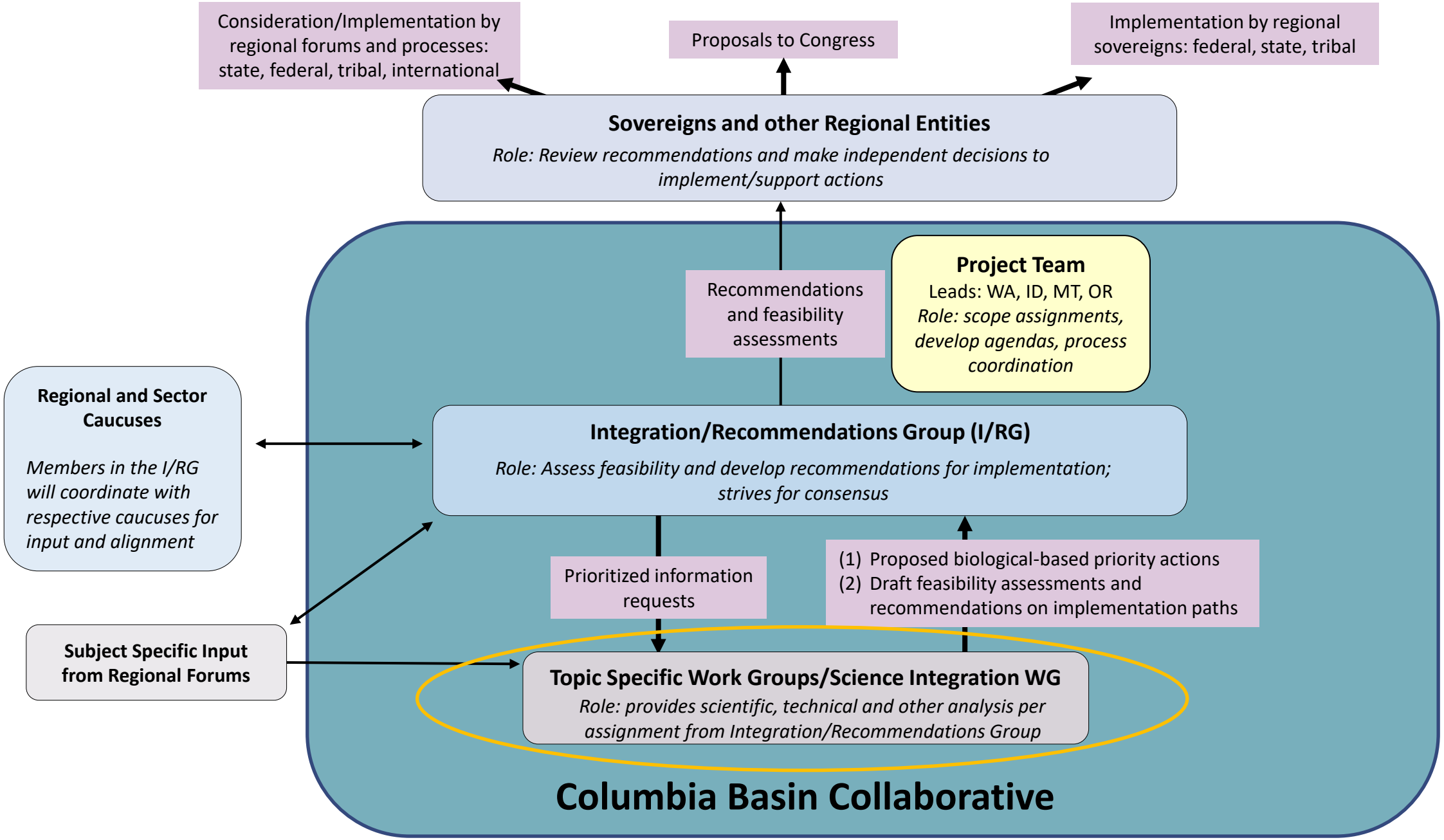
- Honor the agenda
- Listen to understand and ask questions to clarify
- Balance speaking time
- Don’t pile on
- Be hard on the problems, soft on the people
- Seek alignment and common ground wherever possible
- Be present

Agenda Review

Time (PT)	Topic	Presenter
9:00 – 9:15 am	Welcome, Opening Remarks, and Agenda	Liz Mack, Kearns & West
9:15 – 9:25 am	Feedback from I/RG	Liz Mack, Kearns & West
9:25 – 10:10 am	CBPTF Salmon Slider	Tucker Jones, ODFW
10:10 – 10:50 am	Gaps and Needs	Liz Mack, Kearns & West
10:50 – 11:00 am	Confirm Next Steps and Summary and Action Items	Liz Mack, Kearns & West

Feedback from I/RG

A regional approach to achieving the Columbia Basin Partnership goals



SIWG Work Plan

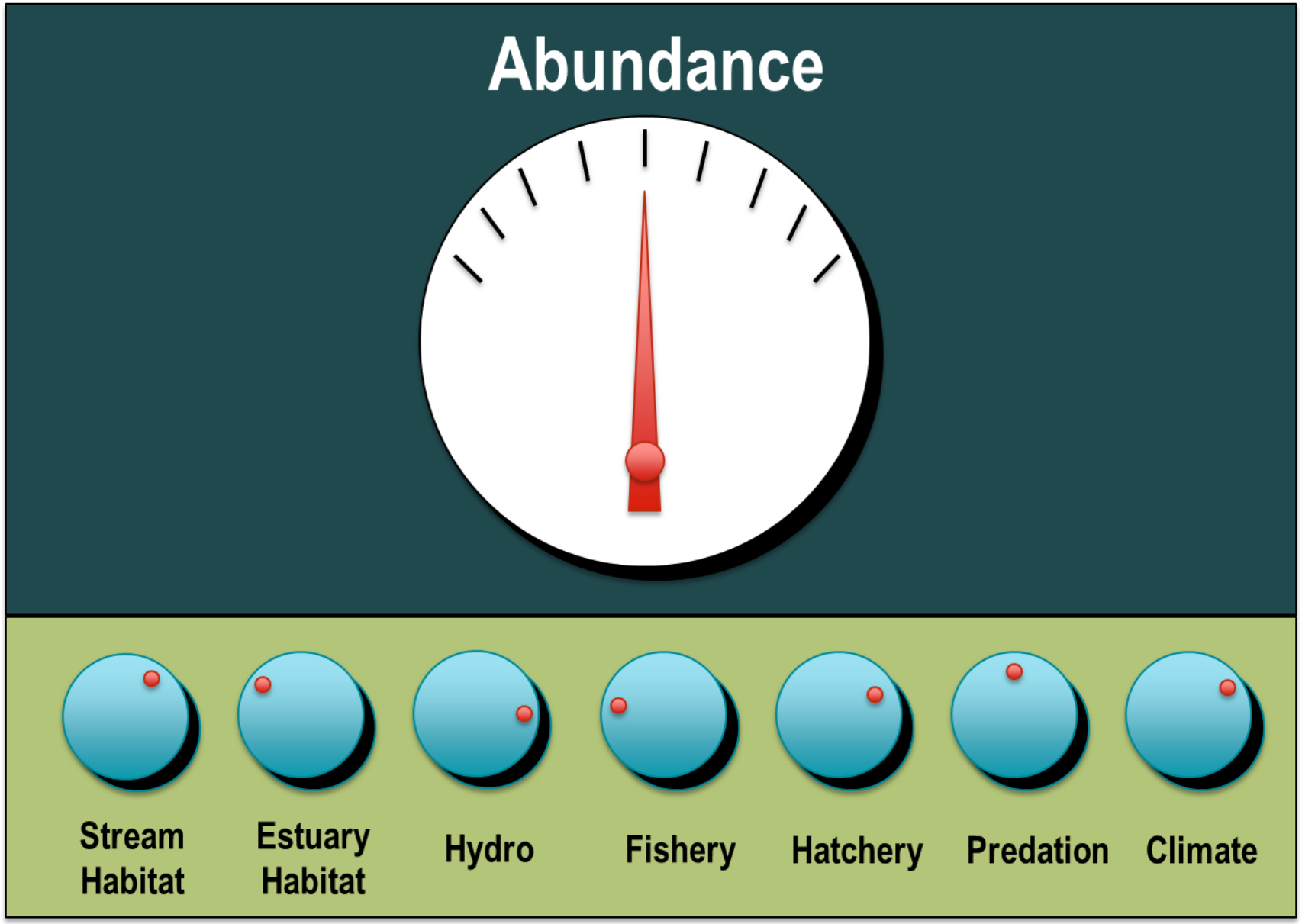
Meeting	Key Topics/Outcomes
Kick off	• Come to shared understanding of the assignment from the I/RG and information available from the CBPTF. • Assess science, implementation and infrastructure gaps that reach across the threat categories. • Agree on next steps.
#2	• Review any feedback from the I/RG and come to a shared understanding of the assignment. • Review the CBPTF Salmon Slider and decide if and how the work group will use it as a tool to facilitate discussion on cross-cutting actions. • Also consider identified science and knowledge gaps and discuss potential actions that could address these.
#3	• Continue discussions on potential cross-cutting actions with the aim of developing draft actions. • Look across the geographies within the basin and see if there are actions needed that aren't captured by one of the threat categories.
#4 and beyond	• Develop recommendations on cross-cutting actions. • As recommendations come out of the topic-specific work groups, evaluate the actions for integrated impacts to inform recommendation to IRG.

Recommended Action Form

1. Work Group developing the action:
2. Summary of action:
    a. Is this part of an existing program or new program?
3. Benefit: (link to matrices)
    a. What benefit will the action provide?
    b. What data support this?
4. Entities that would implement that action:
5. Timing:
    a. How long will it take to implement that action?
    b. How long until fish populations benefit from action?
6. Stock(s) benefited by the action and magnitude of benefit for each stock(s)
7. Estimated cost:
8. Uncertainties related to the action:
9. Regulatory processes or policies associated with the action:
10. Potential challenges:
11. Adaptive management (describe how this will be incorporated into to action):

CBPTF Salmon Analyzer (aka the Salmon Slider)

Slider Genesis



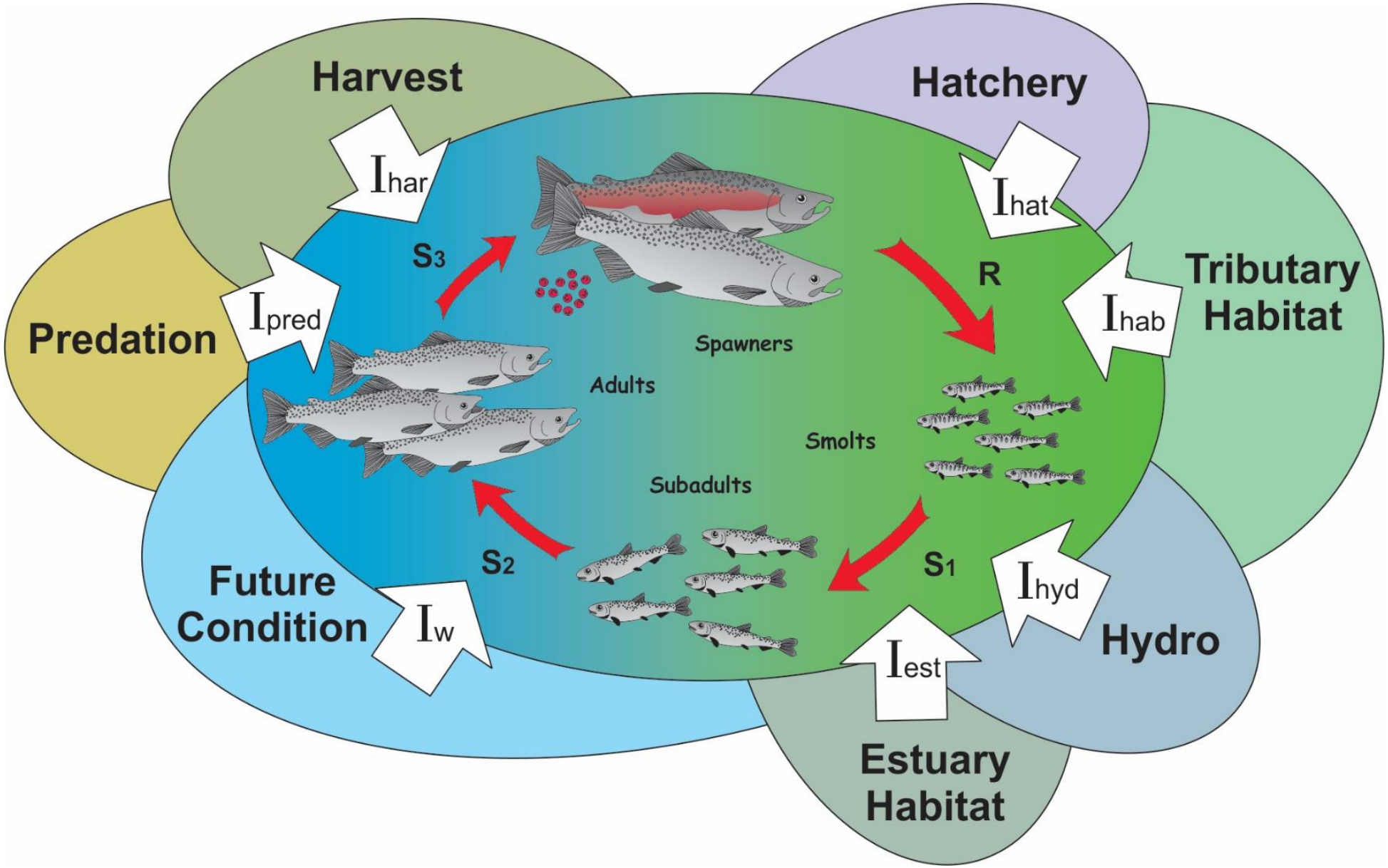
Limiting Factor Analysis

Limiting Factor	Definition
Tributary Habitat	Percentage reduction in productivity of natural-origin fsh due to habitat degradation in tributary production areas
Estuary Habitat	Mortality rate of juveniles during migration from Bonneville Dam to the Columbia River mouth
Mainstem	Cumulative percentage mortality of juveniles and adults during migration between dams through the Columbia and Snake River mainstems ("reach mortality") and the reduction in productivity due to spawning habitat inundation
Latent Mortality	Percentage mortality due to passage through the Columbia Basin hydropower system but manifested in the estuary and ocean
Blocked Areas	Percentage loss in potential production due to dams that block access or inundate historically accessible habitat
Predation	Percentage mortality due to potentially manageable predators. These include birds, pinnipeds, and fish where empirical estimates of mortality are available
Fisheries	Mortality occurring in or as a result of handling in fisheries
Hatchery	Percentage reduction in natural productivity due to the effects of hatchery fish on natural population diversity, productivity, and fitness, as well as effects on fish health and effects resulting from complex ecological interactions

Limiting Factor Analysis – Heat Map

	Stock	Tributary Habitat	Estuary	Hydro/ Mainstem	Hydro/ Latent	Hydro/ Blocked	Predation	Fishery	Hatchery
Lower Columbia	Spr Chinook	85	17	0	0	30	14	17	29
	Fall (tule) Chinook	70	21	0	0	15	11	33	25
	Fall (bright) Chinook	10	21	0	0	40	11	47	0
	Chum	95	50	5	0	0	2	1	10
	Coho	80	11	0	0	5	13	17	22
	Sumr Steelhead	65	28	4	0	40	19	5	8
	Win Steelhead SWW	60	28	0	0	0	19	5	17
	Win Steelhead LCR	65	28	0	0	10	19	5	9
Willamette	Spr Chinook	85	20	0	0	50	19	13	25
	Win Steelhead	80	28	0	0	20	32	3	2
Middle Columbia	Spr Chinook	85	17	23	14	25	25	15	24
	Fall Chinook	20	27	13	9	5	10	55	0
	Coho	0	11	30	19	0	17	22	na
	Sockeye	0	17	19	9	99	8	3	na
	Sumr Steelhead	80	28	11	14	20	33	10	17
Upper Columbia	Spr Chinook	45	18	49	38	75	29	15	32
	Summer Chinook	50	27	44	38	50	13	61	27
	Fall Chinook	25	27	65	19	5	13	61	10
	Sockeye	50	17	38	38	80	24	12	10
	Sumr Steelhead	40	31	30	38	95	52	10	24
Snake	Spr Chinook	50	16	39	38	30	29	14	15
	Fall Chinook	25	27	62	38	80	13	45	na
	Sockeye	10	17	47	38	70	24	6	na
	Sumr Steelhead	45	27	30	38	40	43	25	24

Life-Cycle Analysis – The Salmon Analyzer



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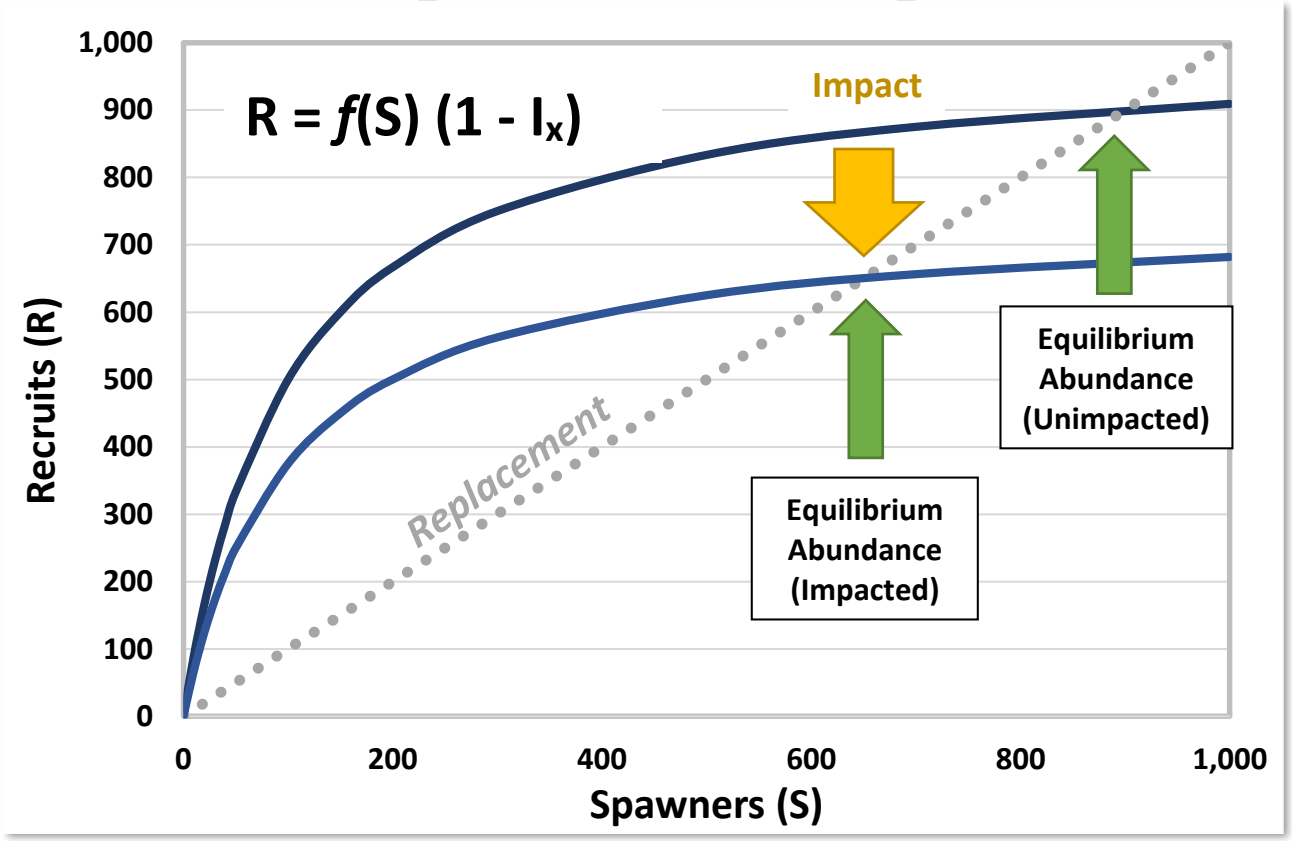


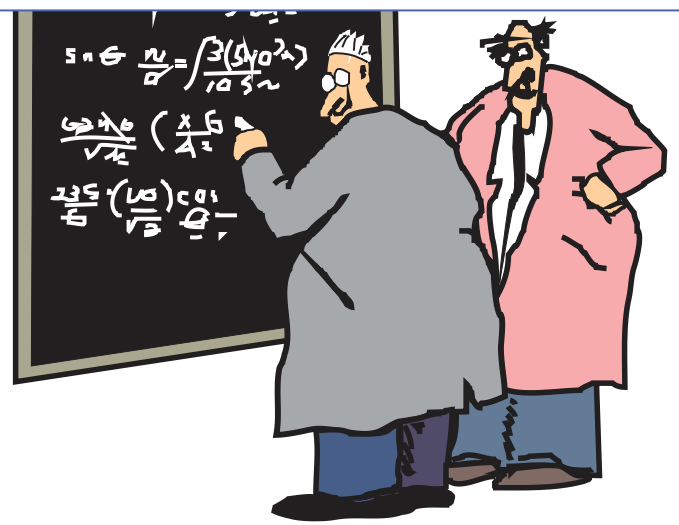
The basic model formulation is:

$$\bar{A} = \bar{A}' [(1 - I_1) (1 - I_2) \ldots (1 - I_x)]$$

Where, $\bar{A}$ = current average (equilibrium) abundance.

$\bar{A}'$ = historical average (equilibrium) abundance that would have occurred in the absence of human-related or potentially manageable impacts.

I_x = potentially manageable impacts for factor x.



~~All~~ Some models are ~~wrong~~ useful

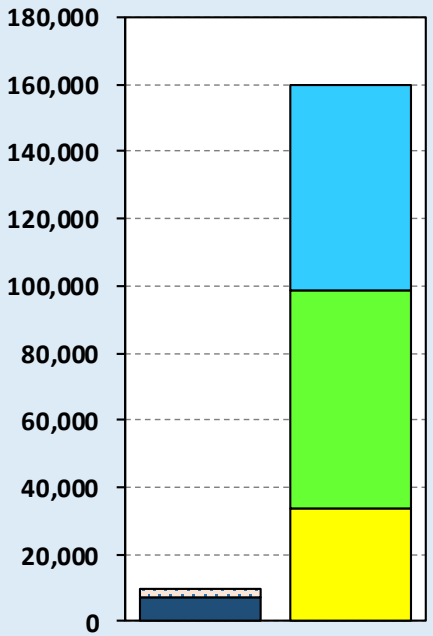
Life-Cycle Analysis – The Salmon Analyzer

Salmon Analyzer (*aka* the salmon slider) *v 2.0*

Stock Spr Chinook Snake

7/6/2020

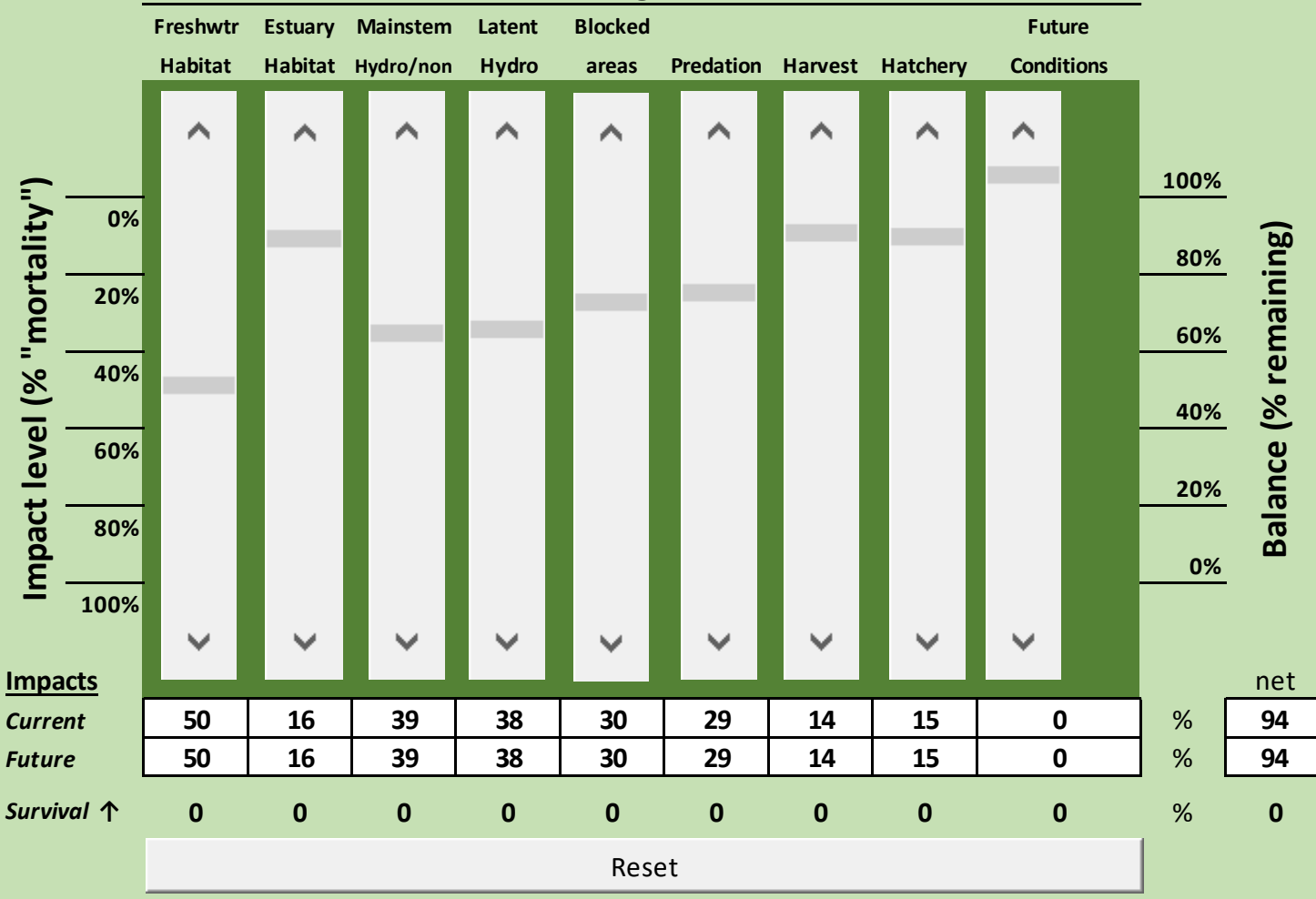
Abundance



Natural	Actual	Goal	
Current	6,988	33,500	*low*
Future	6,988	98,750	*med*
Historical	1,000,000	159,500	*high*

Hatchery	#	% hat origin
Current	2,990	30%
Future	2,990	30%

Limiting Factor



Impacts	Freshwtr Habitat	Estuary Habitat	Mainstem Hydro/non	Latent Hydro	Blocked areas	Predation	Harvest	Hatchery	Future Conditions		net
Current	50	16	39	38	30	29	14	15	0	%	94
Future	50	16	39	38	30	29	14	15	0	%	94
Survival ↑	0	0	0	0	0	0	0	0	0	%	0

Reset

Sensitivity Analysis

- Zero all
- Fix all freshwater habitat
- Fix estuary
- Zero mainstem impacts
- Zero latent mortality
- Open & restore blocked areas
- Zero predation
- Zero harvest & hatchery

Alternative inputs

	Lo	*Hi*
Latent	○	○
Hatchery	○	○
All	○	○

Scenarios

- proportional 10% decrease in eacl
- proportional 30% decrease in eacl
- proportional 50% decrease in eac
- TBD

Future conditions

- No Change
- Small Change
- Moderate Change
- Large Change

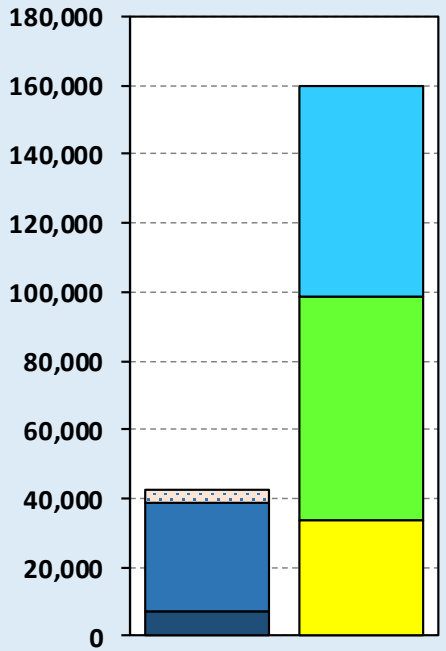
Life-Cycle Analysis – The Salmon Analyzer

Salmon Analyzer (*aka* the salmon slider) *v 2.0*

Stock Spr Chinook Snake

7/6/2020

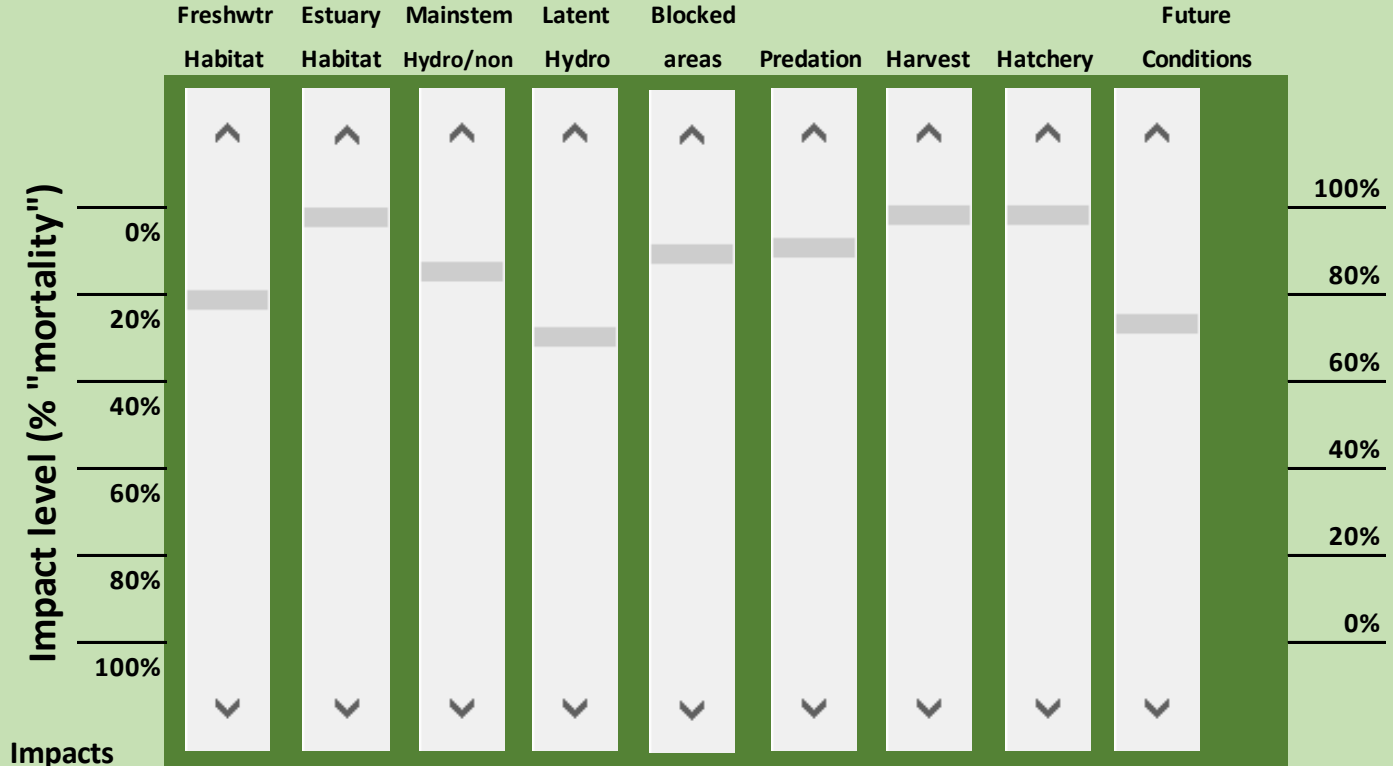
Abundance



Natural	Actual	Goal	
Current	6,988	33,500	*low*
Future	38,448	98,750	*med*
Historical	1,000,000	159,500	*high*

Hatchery	#	% hat origin
Current	2,990	30%
Future	3,930	9%

Limiting Factor



Impacts	Freshwtr Habitat	Estuary Habitat	Mainstem Hydro/non	Latent Hydro	Blocked areas	Predation	Harvest	Hatchery	Future Conditions		net
Current	50	16	39	67	30	29	14	15	0	%	97
Future	25	8	19	33	15	14	7	8	30	%	84
Survival ↑	50	9	32	100	21	20	8	9	-30	%	450

Reset

Sensitivity Analysis

- Zero all
- Fix all freshwater habitat
- Fix estuary
- Zero mainstem impacts
- Zero latent mortality
- Open & restore blocked areas
- Zero predation
- Zero harvest & hatchery

Alternative inputs

	Lo	*Hi*
Latent	○	○
Hatchery	○	○
All	○	○

Scenarios

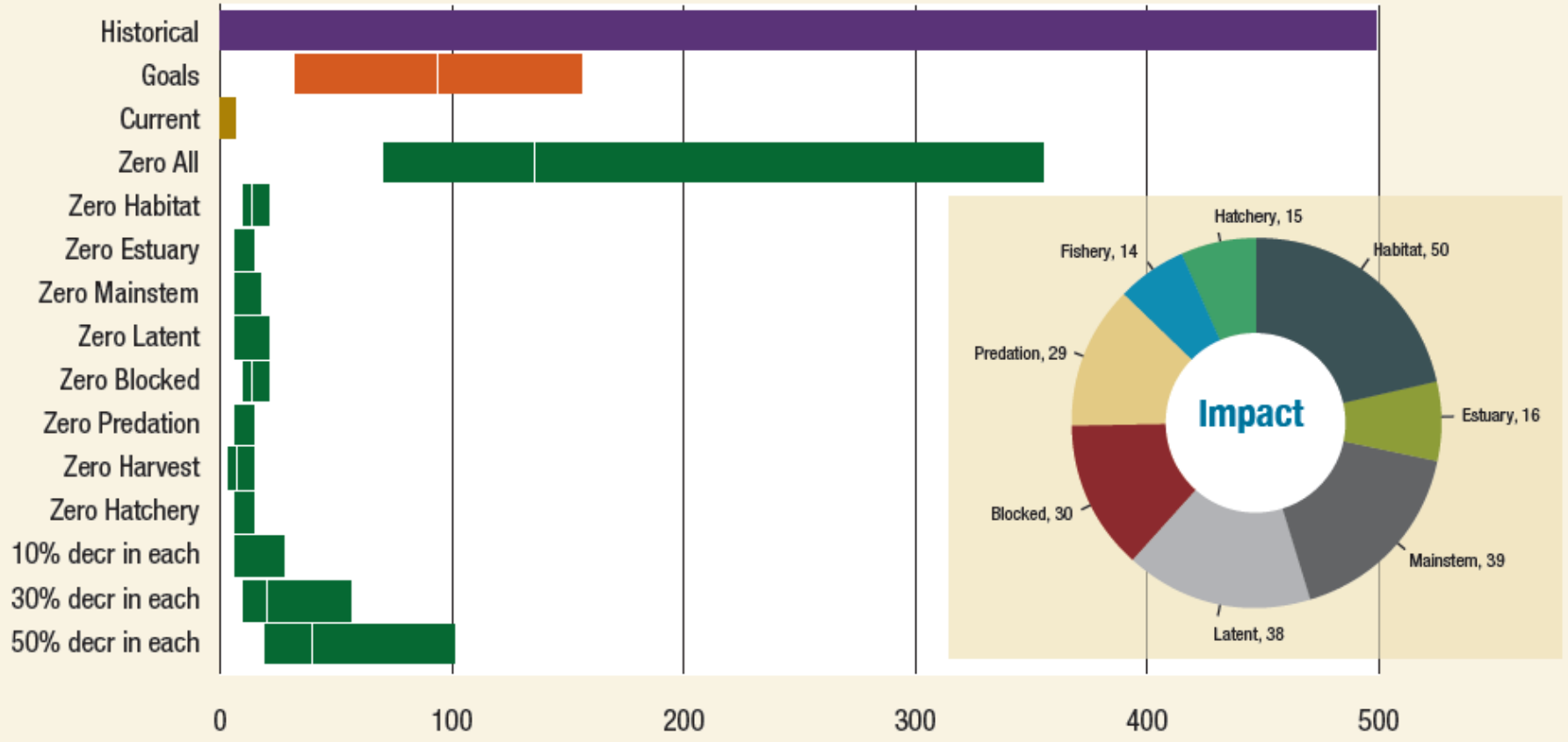
- proportional 10% decrease in each
- proportional 30% decrease in each
- proportional 50% decrease in each
- TBD

Future conditions

- No Change
- Small Change
- Moderate Change
- Large Change

Life-Cycle Analysis – Sensitivity Analysis

FIGURE 33. Life-cycle analysis of the sensitivity of Snake River spring/summer Chinook salmon abundance to reductions in human-related or potentially manageable impacts. Donut chart shows mid-range impact values.



Line on goal bar indicates mid-point of goal range. Green bars depict a range based on uncertainties reported for impact estimates; the mid-line represents the likely value.

Salmon Analyzer Take Homes

- The Salmon Slider is meant for coarse scale evaluations of different impact reductions, not to recommend specific actions
- Doesn't tell us anything about the feasibility of any level of change, or corresponding costs or actions
- Doesn't explicitly reflect the uncertainty in estimation of any particular impact level
- It *can* provide at a coarse level, the relative scale of certain impacts, i.e., how big is a particular dial for a particular stock
- It is meant to be complimentary to other bigger life-cycle modeling efforts

Gaps and Needs

Recap: Criteria for Recommended Actions

- Cross-cutting; not specific to one threat topic
- Helps achieve Low/Medium/High goals of the partnership
- Benefits multiple species
- Acknowledges tribal and treaty rights and legal constraints

Identified Science and Infrastructure Gaps

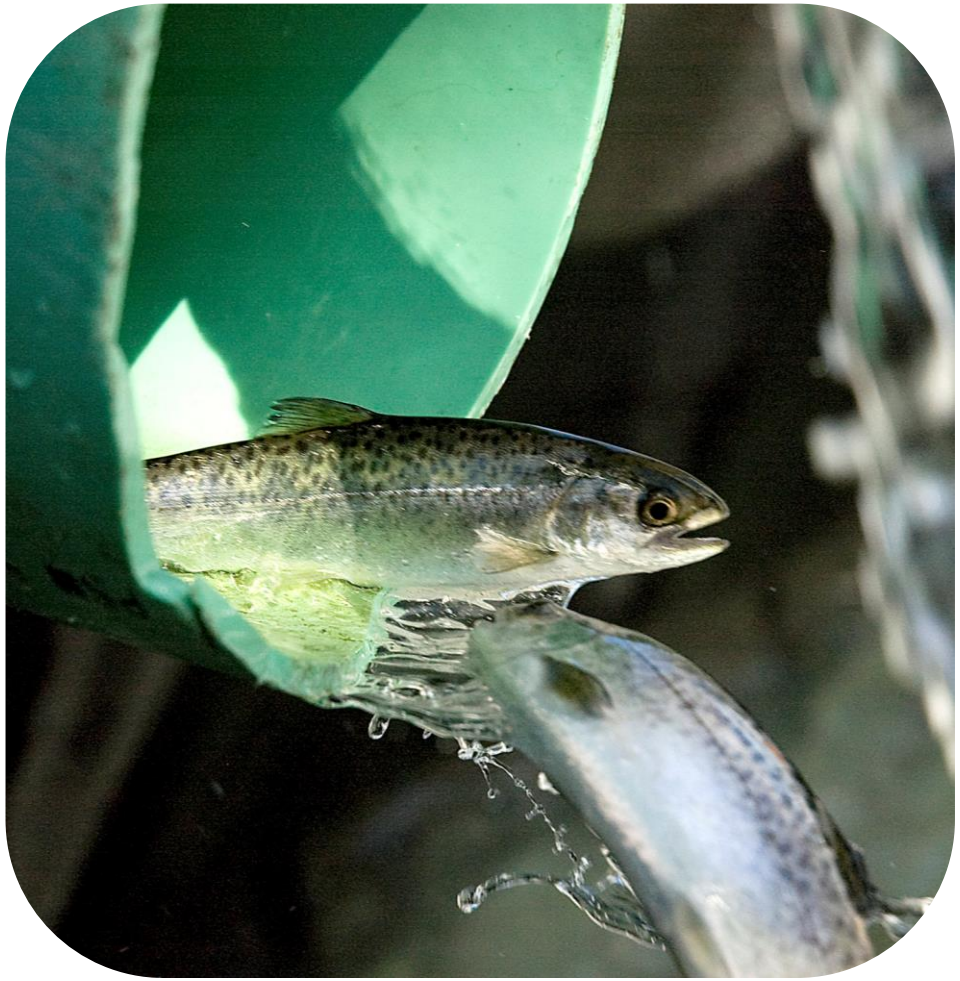
- Brainstormed science and infrastructure gaps that reach across categories during Meeting #1
- What are potential actions that could address these gaps?

Next Steps and Action Items

Next Meeting

Consider potential actions brainstormed today.

Bring ideas for which actions could be developed into draft recommendations to the next meeting.



Additional Next Steps

- Meet again in early December

Thank you ~

Photo credit: Roger Tabor