Fish Tagging Forum

Update

February 12, 2013

Significance of Tagging/Marking

- Roughly $50M to $60M spent in 2012 on tagging/marking related activities
  - Labor and infrastructure for application, detection/recovery, and data analysis
- 7 primary tagging/marking technologies
  - PIT, CWT, Acoustic, Radio, Genetic, Otolith, Adipose Clip
- Approximately 100 biological indicators rely on tags/marks to support decision making
  - Hydro, Habitat, Harvest, Hatchery, Predation, Population Status & Recovery

Purpose of Fish Tagging Forum

(from the Charter)

- address costs, efficiencies and gaps for all fish tagging efforts that take place under the Council's Fish and Wildlife Program, including expense, capital and reimbursable programs.

- address the cost effectiveness and the program effectiveness of tagging under the Program as well as other issues discussed in the ISAB/ISRP report

FTF Timeline and Process

PARTICIPANTS:

Federal:	**State:**	**Tribes:**	**Regional Interests:**	**Other:**
USACE	IDFG	CRITFC	PSMFC	IEAB, ISAB, ISRP
BPA	ODFW	Nez Perce Tribe	NW River Partners	Consultants
USFWS	WDFW	CTGR	Public Power Council	Universities
NOAA		Colville Tribes	NPCC	
USGS			Mid-C PUDs	

Accomplishments to Date

- Reviewed and summarized all major tag types.
- Developed a summary of BPA costs by tag type.
- Developed summary of management questions and indicators supported by tagging information.
- Identified which tagging technologies provide information for the management questions and indicators.
- Identified the management questions and indicators that are a priority to the Council Program.

What's Going on Now in the Forum and What's Next?

- Evaluating the effects of removing funding for a particular tagging technology:
  - Management Questions and Indicators
  - Species
  - Geographic Coverage
  - Shared Resources
  - Cost
- Involving IEAB in cost-effectiveness evaluation
- Developing and reviewing recommendations

Expected Work Products

July 2011 — Council Charters FTF

2011 | 2012 | 2013

NOV DEC JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN FEB MAR APR MAY

May, 2013 — Final Recommendations to Council

Information Compilation and Synthesis

Analysis and Evaluation

Recommendations

Work Products
- Technology vs. Objectives Summary Table
- Life-cycle Infrastructure and Data Management Schematics
- BPA and USACE Cost Information
- Management Questions and Indicator Worksheets

Work Products
- Indicator & Tag Relationship Diagrams (aka Spider Chart)
- "Take Away" Scenario Analysis
- Indicator & Tag Prioritization Spreadsheet
- Basic Cost and Tagging Data Analysis
- IEAB Cost Modeling

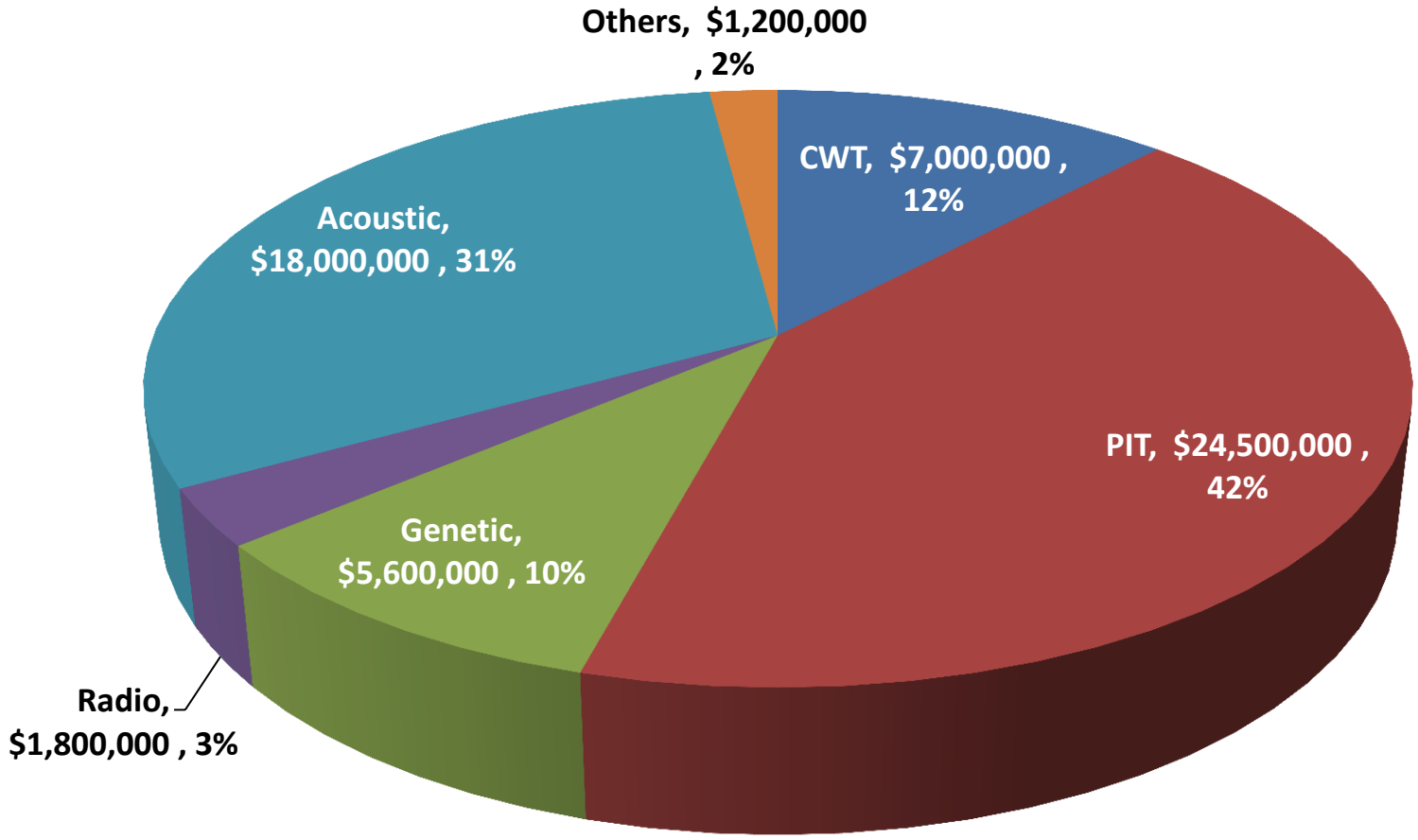
Work Products (TBD)
- Gaps
- Overlaps
- Process Efficiencies
- Policy Choices and Consequences

Some Context For Costs

BPA 2012 Estimated Costs by Tag Type

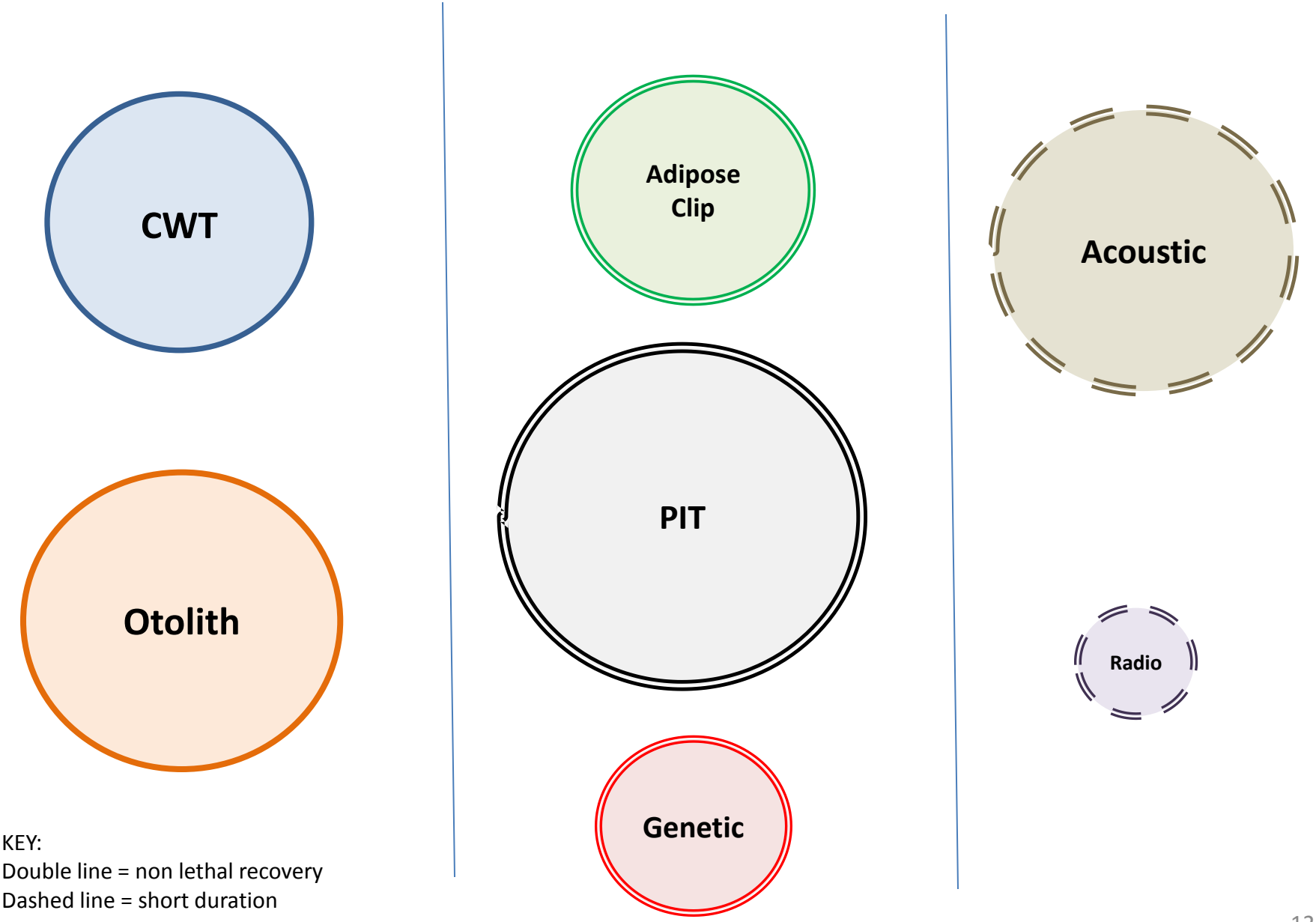
CWT	$	7,000,000
PIT	$	24,500,000
Genetic	$	5,600,000
Radio	$	1,800,000
Acoustic	$	18,000,000
Others	$	1,200,000
TOTAL	**$**	**58,100,000**

BPA 2012 Estimated Costs by Tag Type



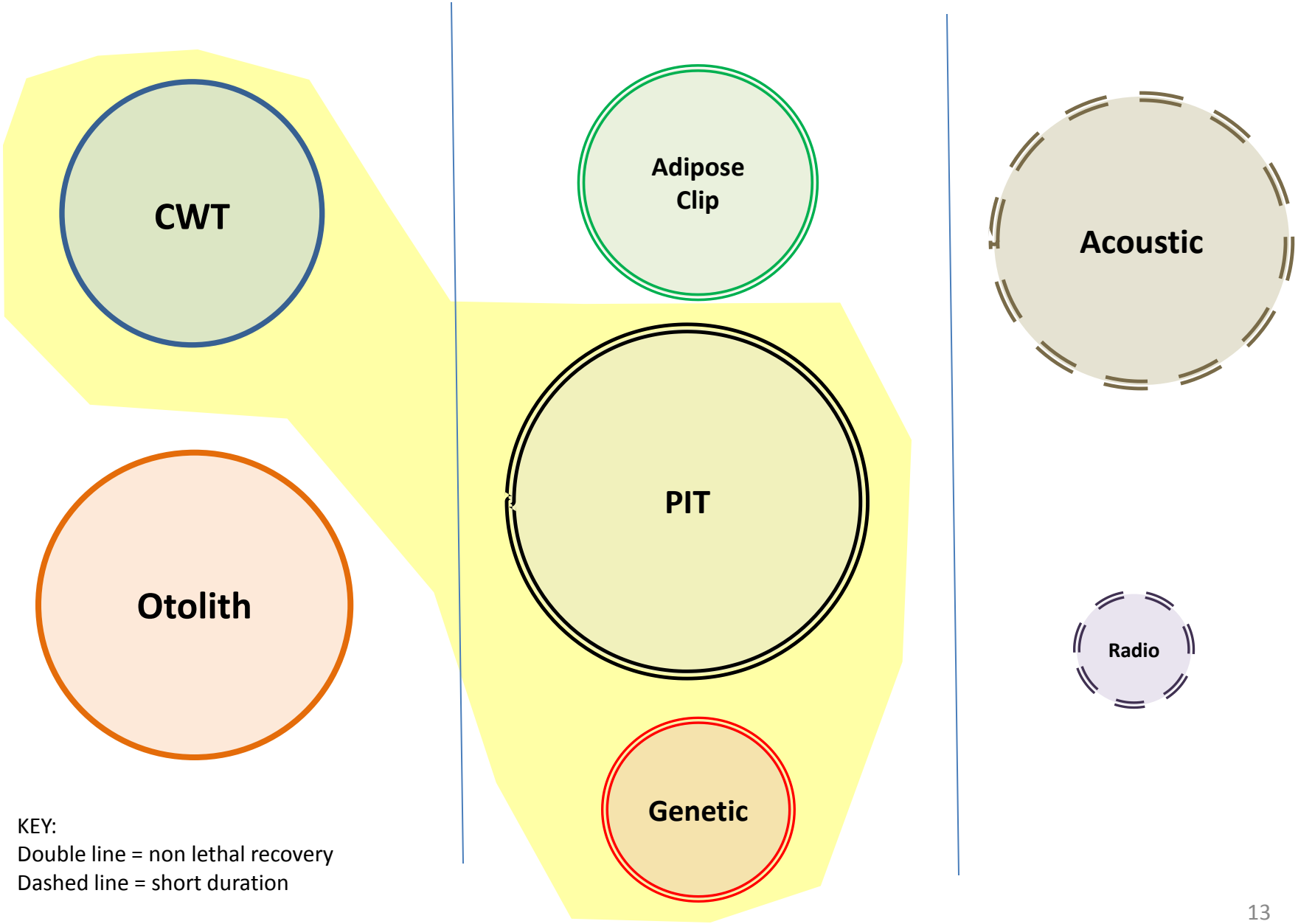
Some Context For Tags

Tags Have Varied Attributes



KEY:
Double line = non lethal recovery
Dashed line = short duration

The Big 3



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The Big 3

Three long lasting tag types produce most of the information currently used to meet the Fish and Wildlife Program management objectives:

- Coded Wire tags
- PIT tags
- Genetic information

In some important ways these three tag types can be viewed as in competition to provide information to answer many management questions in the Fish and Wildlife Program

Tag Types and General Applications

	Data Collection Opportunity		
Tag Use	**Release**	**During Migration**	**Return**
Short-term, special purpose tags.		Acoustic Radio	
Long-term monitoring tags.	PIT Genetics Adipose Clip CWT Otolith	PIT Genetics Adipose Clip	PIT Genetics Adipose Clip CWT* Otolith* *lethal recovery

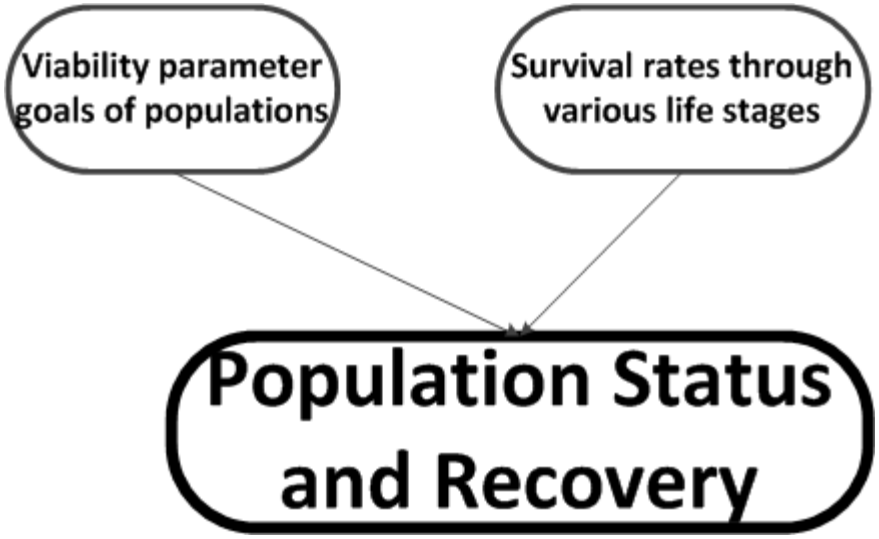
Some Context For How Tag/Mark Data is Used

Example “Spider Chart” Framework

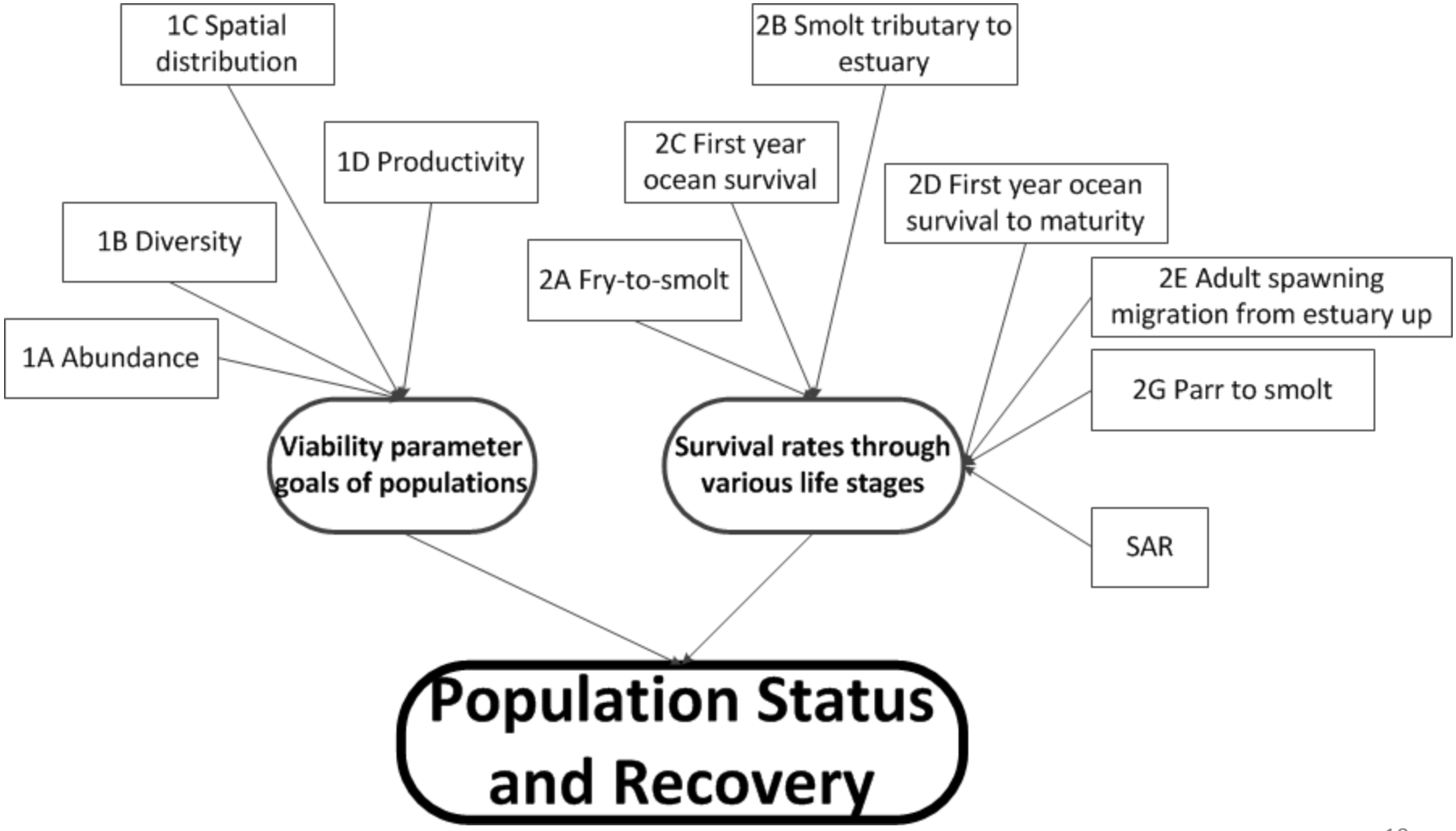
Management Category

Population Status and Recovery

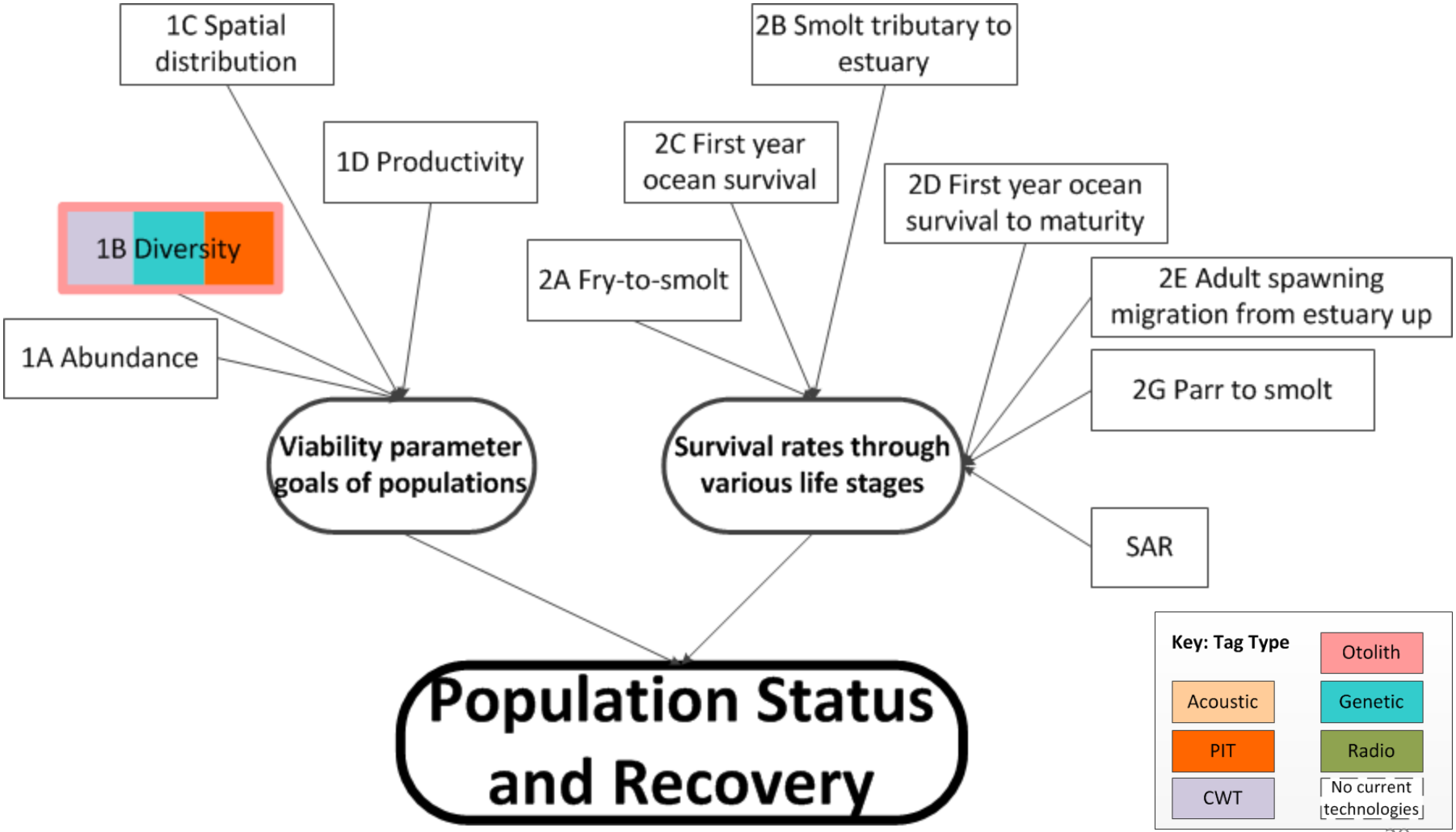
Management Questions



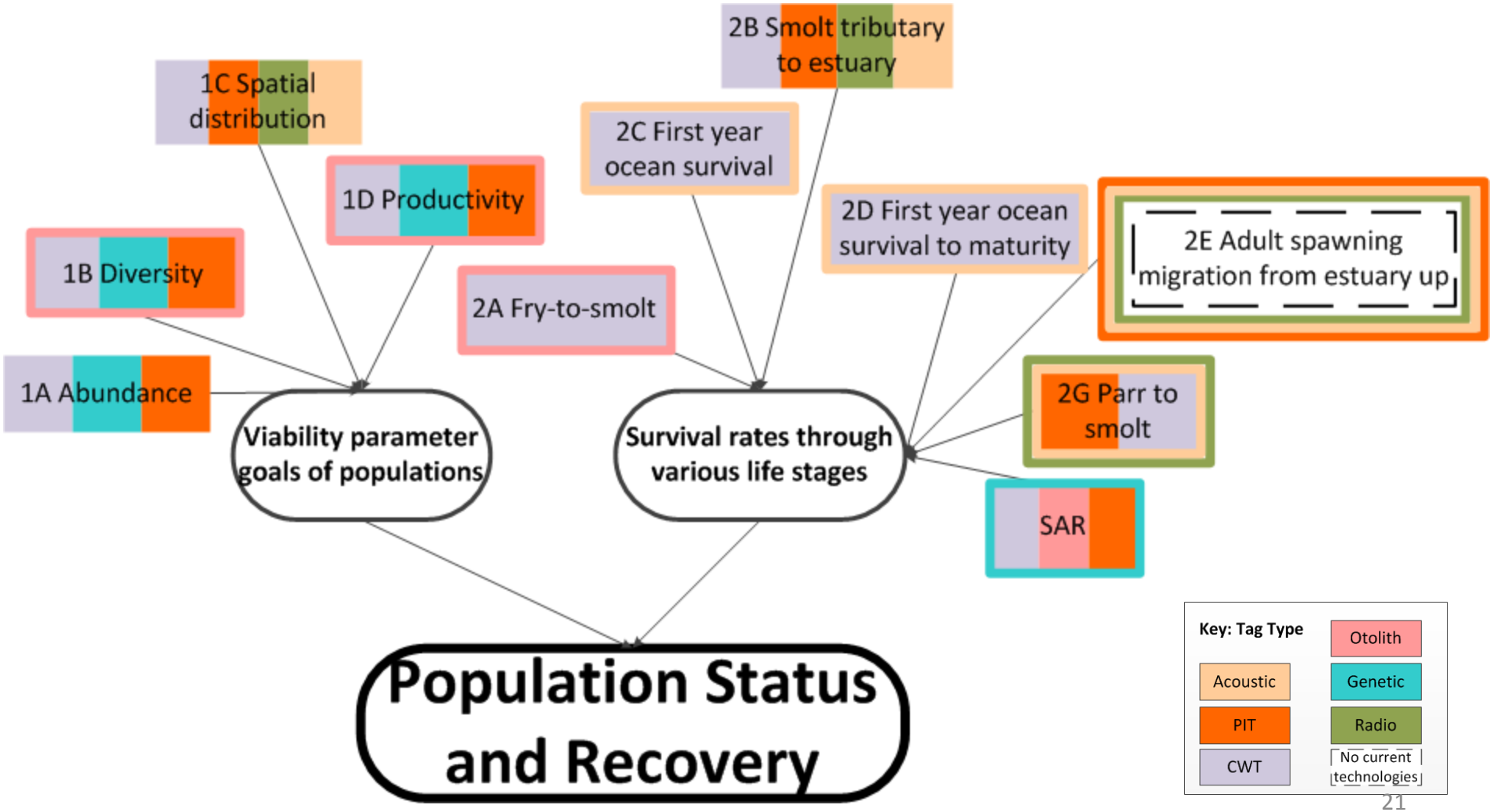
Indicators


1C Spatial distribution
2B Smolt tributary to estuary
1D Productivity
2C First year ocean survival
2D First year ocean survival to maturity
1B Diversity
2A Fry-to-smolt
2E Adult spawning migration from estuary up
1A Abundance
2G Parr to smolt
Viability parameter goals of populations
Survival rates through various life stages
SAR
Population Status and Recovery

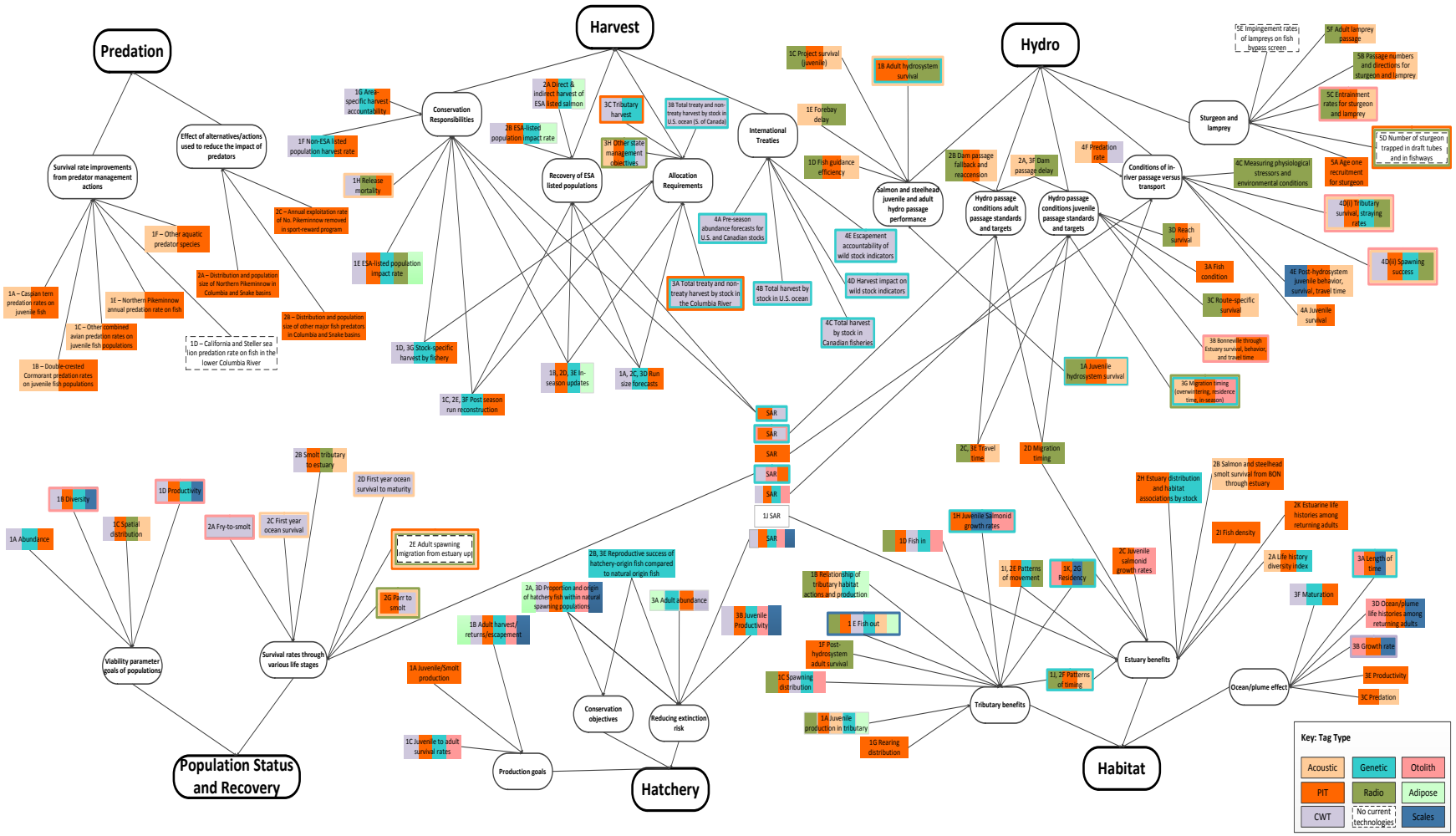
Example Tag/Mark Applications



The Full-Suite of Application



The Whole Enchilada….

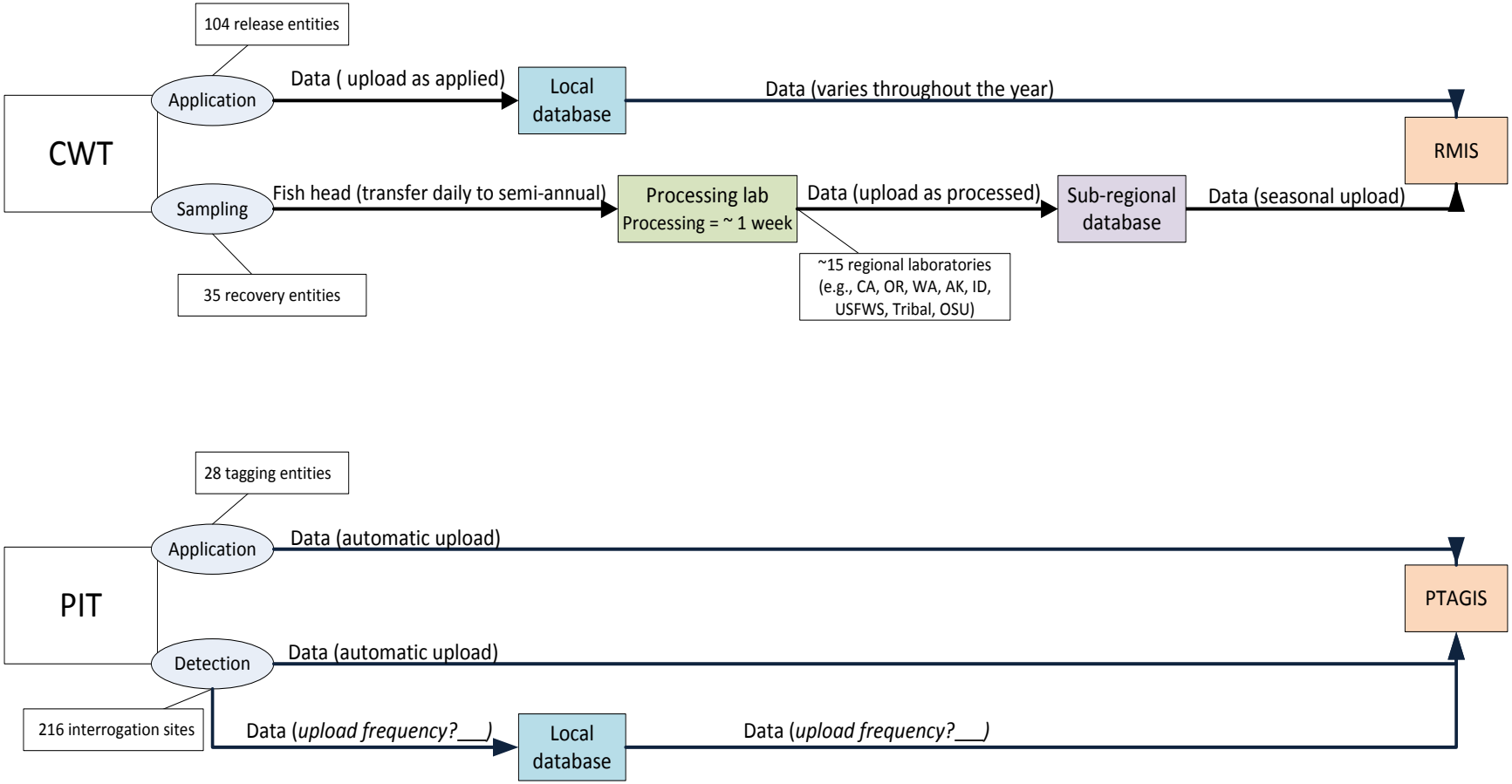


Some Examples of Other Work Products

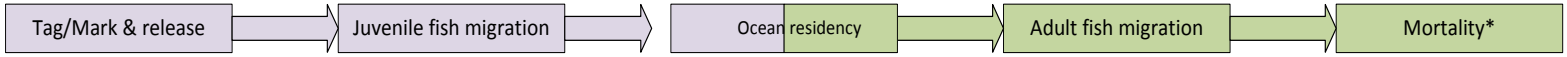
Sample of Technology Summary Table

	FTF Charter Objectives	Acoustic	Adipose Fin Clip	Coded Wire tags	Genetic Markers (PBT/GSI)
3a	What fish are tagged	Acoustic tags are utilized primarily for juvenile Chinook, sockeye, lamprey, and steelhead. Acoustic tags are also used to study adult white sturgeon, walleye, bass, and pikeminnow.	Adipose fin clip is used to mark hatchery-origin fish, including Chinook, coho, and steelhead.	Emphasis of the program is on tagging Chinook and coho, with smaller numbers of steelhead and only a few sockeye tagged each year.	Genetic markers can be applied to any species of fish to allow for individual or stock identification. Standardized microsatellite baselines have been previously constructed for coastwide projects for steelhead, sockeye salmon, Chinook salmon and coho salmon.
3a	Number fish marked/tagged	There are currently 65,000 unique JSATS tag codes in the Columbia and Snake river basins. At Chelan County PUD, between 4000 - 4500 juvenile fish are tagged/year per species. At Cougar Dam in 2011, USGS tagged 1000 juvenile Chinook, and at the Detroit project in 2012, the USGS will use 1200 tagged fish.	A 1995 Washington State law and 2003 US Department of Interior law required visual marking of hatchery fish.	About 56 million smolts are coded wire tagged each year at about 260 hatcheries along the West Coast. In CRB, between 22-24 million fish are coded wire tagged.	Under the current BPA-funded project ~90-95% of Snake River spring/summer Chinook salmon and steelhead hatchery broodstock are successfully genotyped and all of their offspring are genetically tagged. Approximately 9 million steelhead and 12 million spring/summer Chinook salmon are tagged each year under the current Snake River PBT project.
3a	Number fish or tags recovered/detected	95% detection rate through the mainstem Columbia,	N/A	There is a goal to sample about 20% from each of the fisheries for CWTs; escapement sampling goal of 5% from each spawning ground; 100% sampling of hatchery returns. Total Columbia River catch in 2010 was 616,777, with 75,774 CWTs recovered (12%).	Thousands of fish are being recovered as part of GSI projects in the Pacific Ocean and in the Columbia River basin. At least 5,000 PBT tagged steelhead and 9,000 spring/summer Chinook salmon are sampled per year.
3a	Entity releasing fish	*USCOE; Grant County PUD ; Chelan County PUD, some USGS and USFWS*	Virtually all coho and spring/summer Chinook raised with the intent of supporting fisheries are adipose fin clipped.	47 federal, state and tribal fish agencies and other private entities tag fish.	IDFG, ODFW, WDFW, USFWS, NPT, IPC
3a	Entity recovering/detecting fish	*USCOE; Grant County PUD ; Chelan County PUD, some USGS and USFWS*	State and tribal fishery management organizations.	*ADFW, DFO, ODFW, CDFG, WDFW, Northwest Indian Fisheries Commission, IDFG, Nez Perce Tribe, Quinault Nation, Quileute Tribe, Umatilla Tribes (35 different federal, state and tribal fisheries agencies and other private entities)*	IDFG, ODFW, WDFW, USFWS, NPT, IPC
3a	Purpose of tagging	Acoustic tags address dam passage survival and dam passage behavior in 2-D and 3-D, estimate survival through the estuary, survival of transported fish, and migration and fate of adult fish (as well as lamprey). Acoustic tag studies are able to support identification and evaluation of fish passage technologies, operations, and techniques. The technology can allow managers to better understand fish passage efficiency, spill passage efficiency, route-specific survival, and dam passage survival.	The purpose of fin clipping is to identify particular stocks of fish, such as hatchery-origin fish, as recommended by ISRP. Fin clipping is also used for brood stock management to identify the hatchery-origin fish component in the hatchery and on the spawning grounds.	Provide data on stock-specific migrations, ocean distribution patterns, and migration corridors of juvenile salmonids. Currently, CWT data are used in hatchery management to evaluate rearing and release experiments, estimate adult production, estimate SAR, and manage broodstock.	Used to estimate stock-specific data of wild and hatchery origin fish on ocean abundance, harvest, distribution, survival, and migration timing; estimate direct and indirect harvest of ESA listed salmonids, hatchery adult straying, reconstruct runs, predict adult run abundance, assess stock-specific temporal and spatial distribution of juvenile salmon and steelhead in the Columbia River estuary; estimate stock-specific harvest rates by commercial, recreational, and tribal fisheries in the Columbia River.

Life Cycle Data Management Schematics



Life Cycle Infrastructure Schematics



Adipose fin clip	Marking trailers	N/A	N/A	N/A	N/A
Acoustic	Tags, trailers, smolt traps	Autonomous receivers, mobile tracking units, cable arrays	Autonomous receivers, detection wands	Autonomous receivers, mobile tracking units, cable arrays	N/A
Genetic	Juvenile: N/A Broodstock: sampling equipment, lab processing	Sample collection equipment, lab processing	*Sample collection equipment, surface trawls, lab processing*	Sample collection equipment, lab processing	Sample collection equipment, lab processing
CWT	Tags, trailers, marking machines, handheld injectors	N/A	N/A	N/A	Snout collection equipment, detection wands, lab processing
Otolith	Insulated box, thermal chilling system, lab processing, smolt traps	N/A	N/A	N/A	Sample collection equipment, lab processing
PIT	Tags, trailers, smolt traps, tag application equipment	In-stream arrays, dam arrays	*Surface trawls*	In-stream arrays, dam arrays, handheld detection wands	Handheld detection wands, flat plate antennas, pole mount antennas
Radio	Tags, smolt traps, tag application equipment	Aerial and underwater antennas, mobile tracking units	N/A	*Adult counting weirs, tags, mobile tracking units*	*Mobile tracking units*

*Fish mortality data may be collected at any stage of the fish life cycle from harvest, recovered carcasses, and predators

NOTE: Italicized text indicates data collected outside Fish Tagging Forum materials

Indicates fish handling
Juvenile salmonid
Adult salmonid