Steelhead and Chinook Adult Abundance Monitoring Utilizing PIT Tag Arrays

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ISEMP Integrated Status & Effectiveness Monitoring Program

Answering Questions Across Different Spatial Scales

- Region-wide monitoring program to assess:
  - Key Questions addressed
    - Status Monitoring
    - Adult abundance
    - Juvenile abundance
    - Population productivity
    - Freshwater productivity

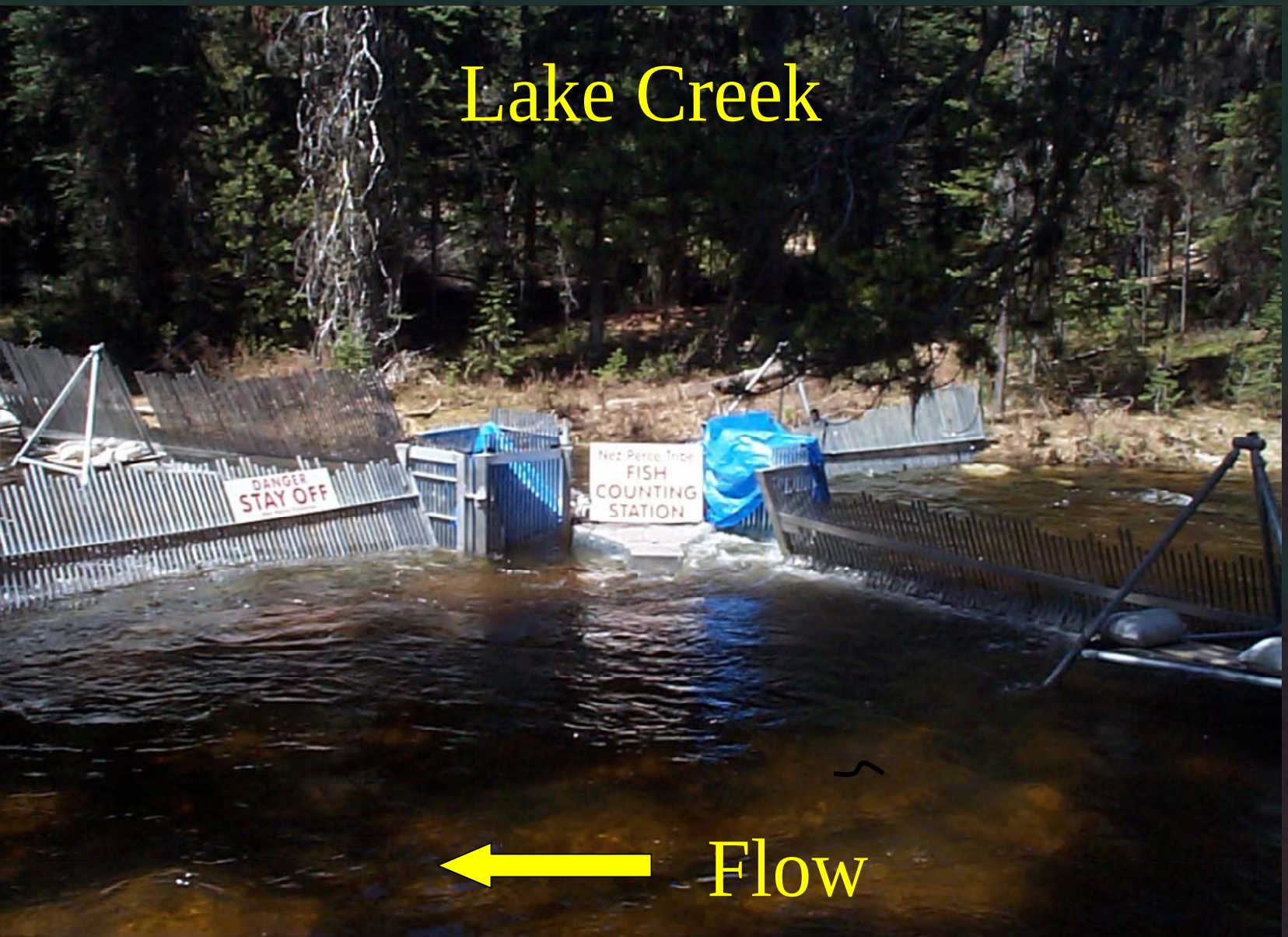
Tools in Our Toolbox

- **Adult Abundance**

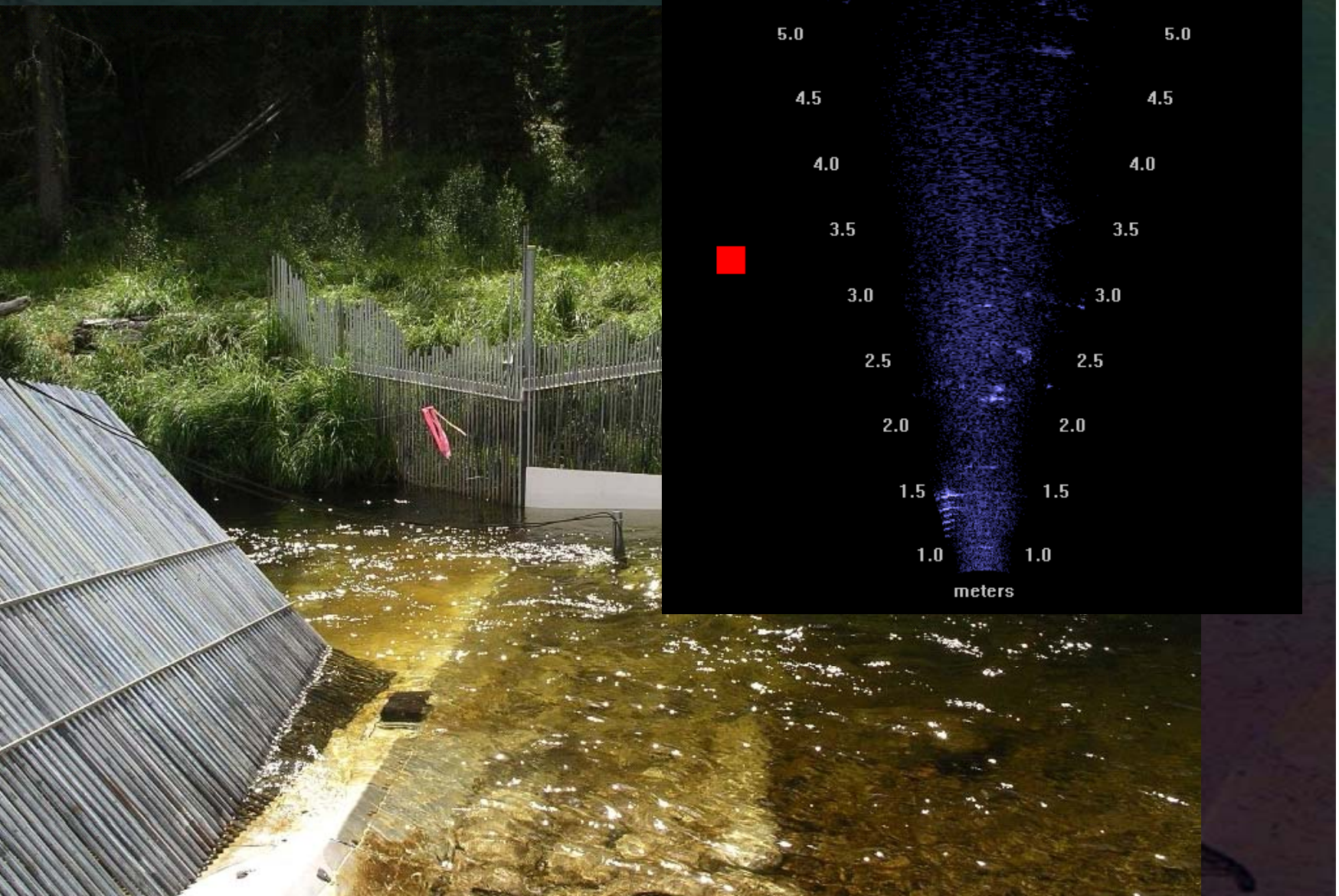
Adult Picket Weirs

Floating Weirs

Video Weir


Lake Creek
DANGER
STAY OFF
Nez Perce Tribe
FISH
COUNTING
STATION
Flow

Sonar -DIDSON



E
Washington
Oregon
N
W
E
S
Lewiston
Lapwai
N
W
E
S
f

PIT Tag Arrays

Adult Population Metrics

- Abundance
  - Population - Tributary
  - Major Population Group
  - ESU/DPS – Largest Scale

Adult Marking

– Population - Tributary

Adult Marking

Marking Program at Lower Granite Dam
– ESU/DPS – Largest Scale

Weirs have Limitations

Redd Surveys have Limitations

PIT Arrays Have Limitations

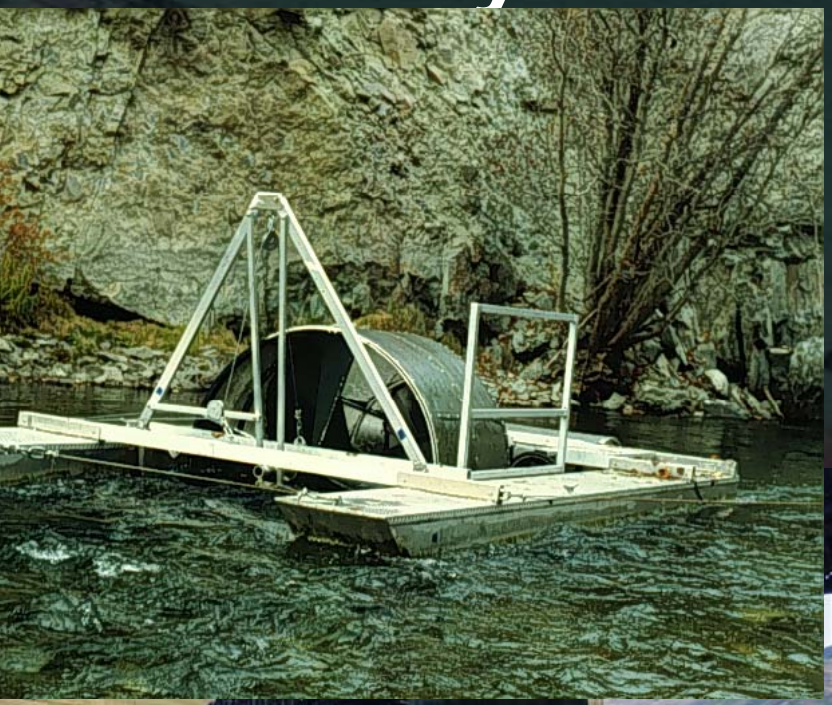
Tools in Our Toolbox

Juvenile Abundance and Survival

Habitat Monitoring

Parr Tagging Tied to Habitat

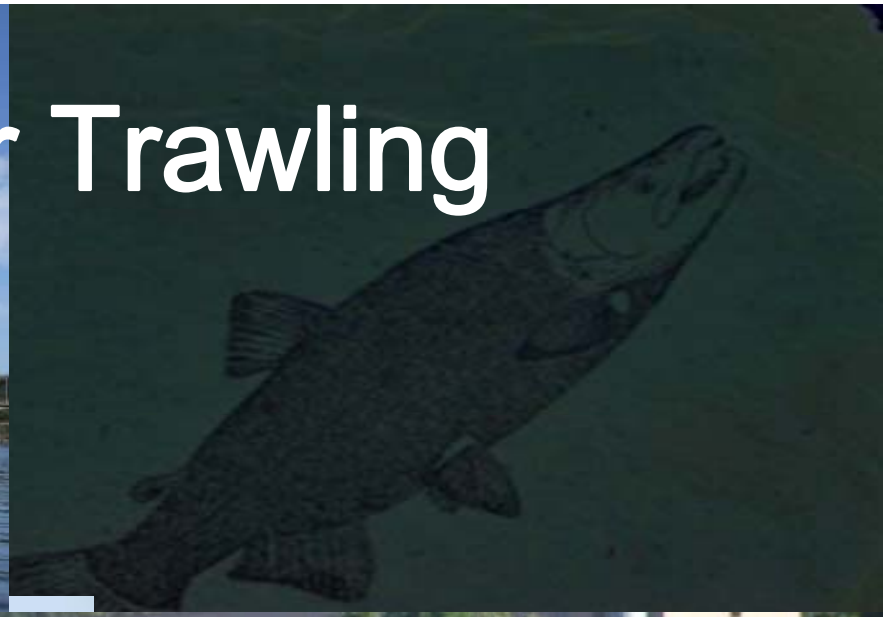
Rotary Screw Trapping



Fyke Netting

Beach Seining

Open Water Trawling



Juvenile Monitoring

Marking Program

- Passive Integrated Transponder (PIT) Tagging

Juvenile Population Metrics

- Tributary, Population, and ESU/DPS scales
  - Abundance
    - Juvenile Emigration
  - Life-Stage Specific Survival
    - Survival To and Through the Hydrosystem
    - Smolt to Adult Ratios
    - Emigrant to Adult Ratios

Juvenile Marking Limitations

PIT Tags – Common Currency

- Juveniles & Adults

How Much Fish Marking Occurs?

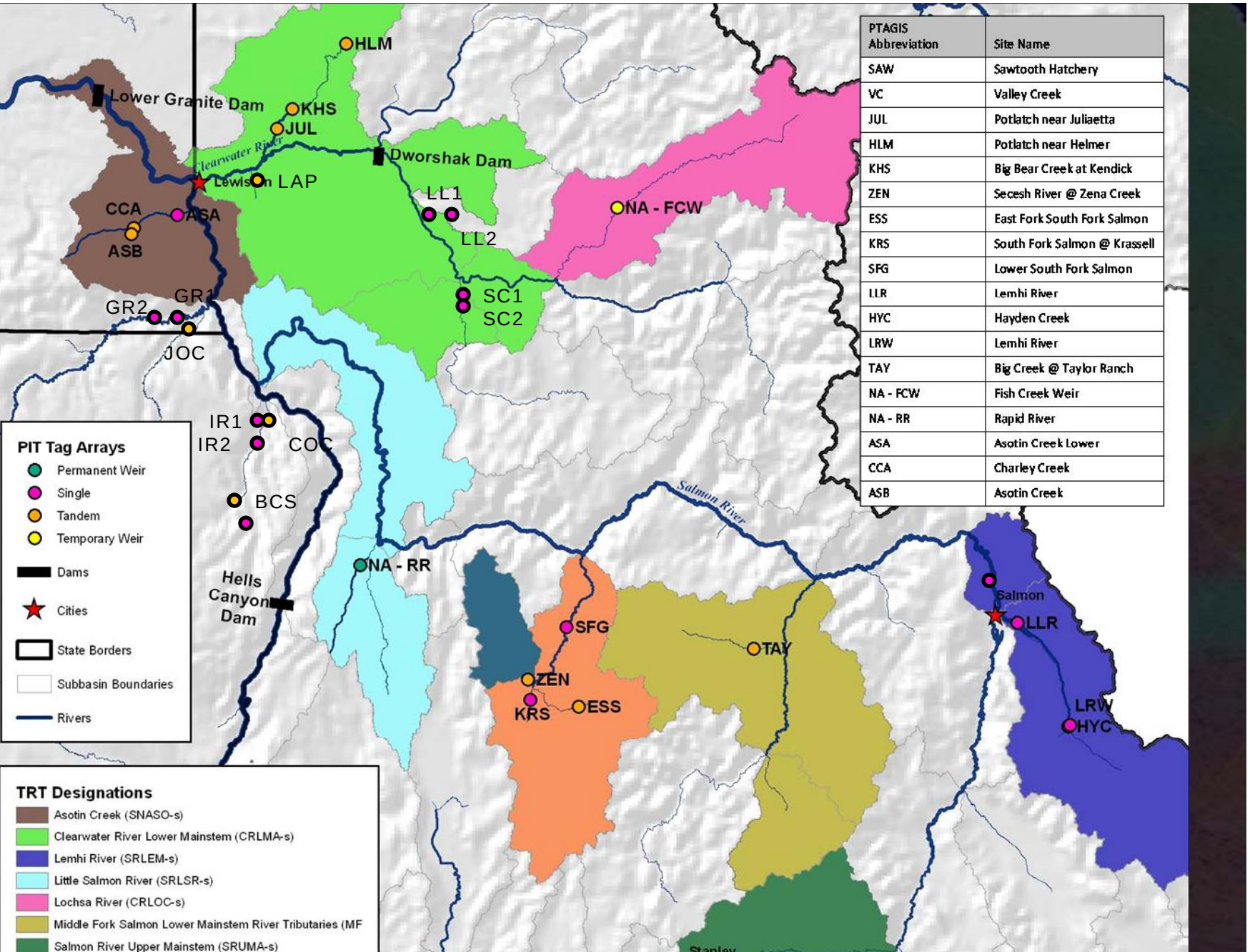
wer - 1,215,800 fish PIT tagged pre-release
- 140,000 post-release (screw traps and dams)

1,355,800

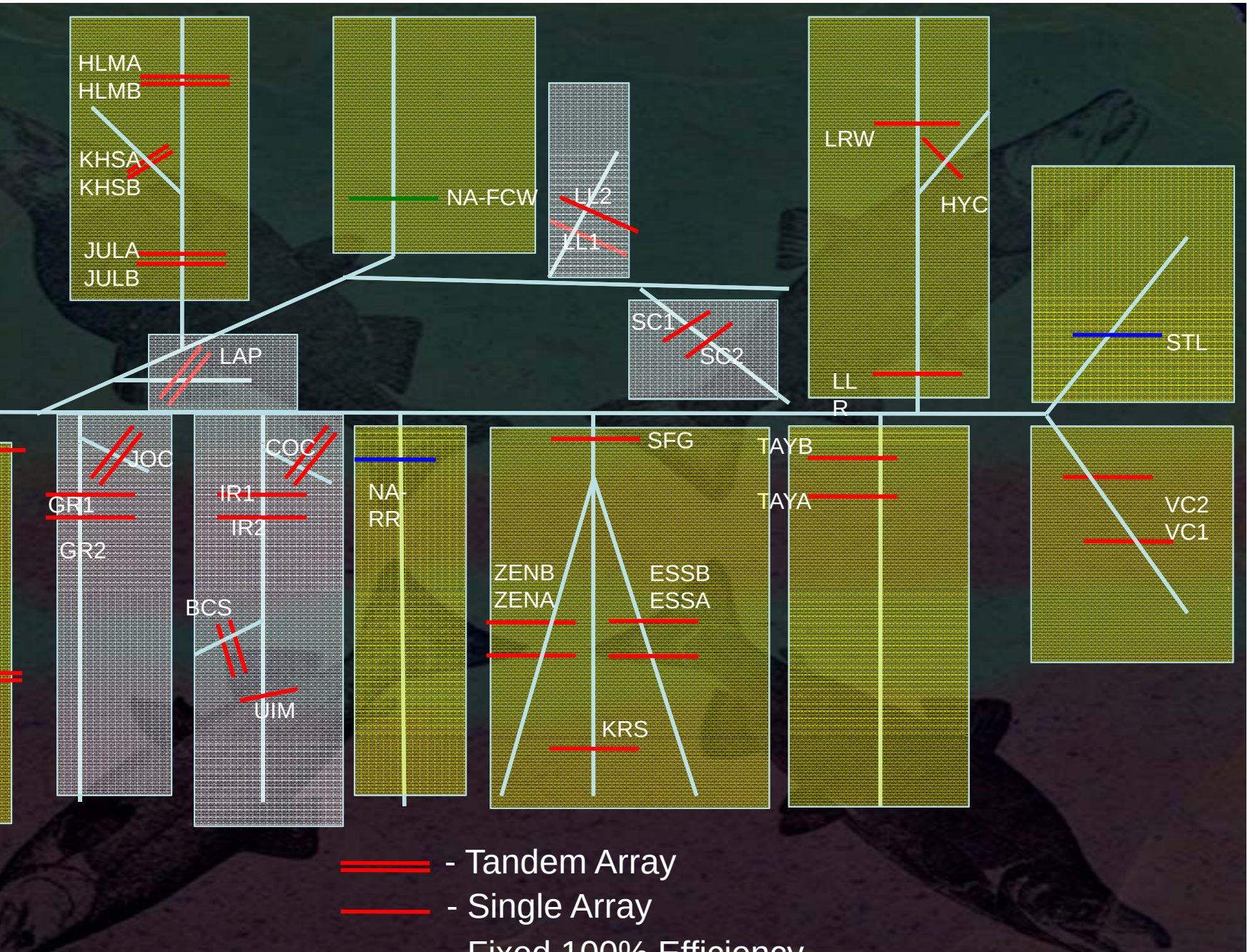
Since 2006, Co managers for Idaho parts of Oregon and Washington have representatively PIT tagging hatchery groups of fish in each Chinook and steelhead release

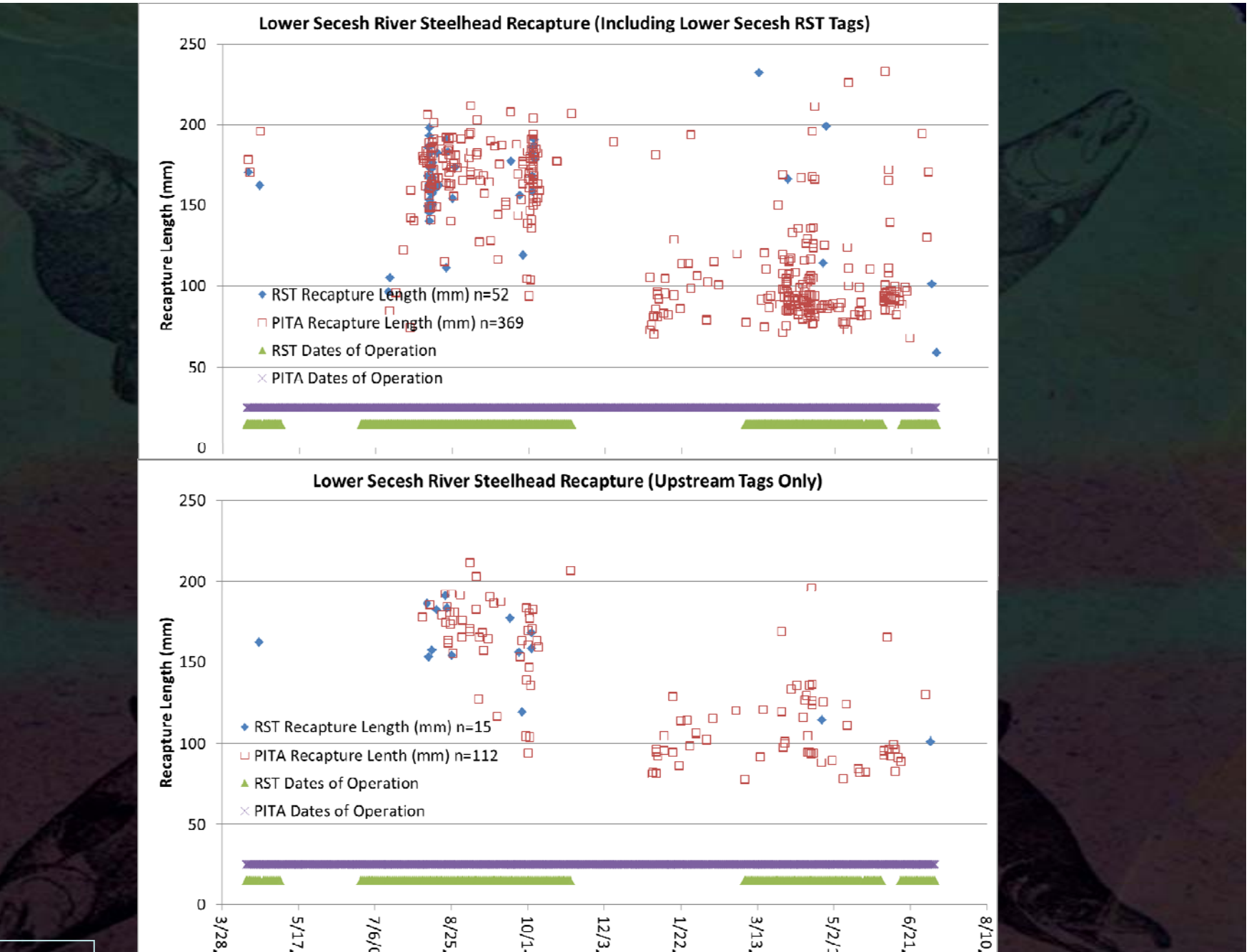
Utilizing PIT Tags – Across Different Spatial Scales

- Population - Tributary
- Major Population Group
- ESU/DPS – Largest Scale



PTAGIS Abbreviation	Site Name
SAW	Sawtooth Hatchery
VC	Valley Creek
JUL	Potlatch near Juliaetta
HLM	Potlatch near Helmer
KHS	Big Bear Creek at Kendick
ZEN	Secesh River @ Zena Creek
ESS	East Fork South Fork Salmon
KRS	South Fork Salmon @ Krassell
SFG	Lower South Fork Salmon
LLR	Lemhi River
HYC	Hayden Creek
LRW	Lemhi River
TAY	Big Creek @ Taylor Ranch
NA - FCW	Fish Creek Weir
NA - RR	Rapid River
ASA	Asotin Creek Lower
CCA	Charley Creek
ASB	Asotin Creek


HLMA
HLMB
KHSA
KHSB
JULA
JULB
NA-FCW
LL2
LL1
LRW
HYC
SC1
SC2
LAP
LL
R
STL
JOC
COC
GR1
GR2
IR1
IR2
NA-
RR
SFG
TAYB
TAYA
VC2
VC1
ZENB
ZENA
ESSB
ESSA
BCS
UIM
KRS
- Tandem Array
- Single Array
- Fixed 100% Efficiency


Lower Secesh River Steelhead Recapture (Including Lower Secesh RST Tags)
Recapture Length (mm)
250
200
150
100
50
0
RST Recapture Length (mm) n=52
PITA Recapture Length (mm) n=369
RST Dates of Operation
PITA Dates of Operation
Lower Secesh River Steelhead Recapture (Upstream Tags Only)
Recapture Length (mm)
250
200
150
100
50
0
RST Recapture Length (mm) n=15
PITA Recapture Lenth (mm) n=112
RST Dates of Operation
PITA Dates of Operation
3/28
5/17
7/6/0
8/25
10/1
12/3
1/22
3/13
5/2/
6/21
8/10

Fraction of Array Detections When Screw Traps Were Not Operable

n	Species	All Tags			Upstream Tags		
		Winter Detection	Downtime Detection	Total Missed	Winter Detection	Downtime Detection	Total Missed
	O. mykiss	8.7%	10.6%	19.2%	16.1%	8.9%	25.0%
eek	Chinook	1.1%	9.7%	10.8%	3.3%	24.4%	27.8%
eek	*O. mykiss*	1.2%	11.2%	12.4%	3.6%	15.9%	19.6%
	Chinook	26.3%	16.3%	42.5%	20.2%	12.5%	32.7%
	O. mykiss	8.8%	2.8%	11.6%	9.6%	2.8%	12.4%

that missed tags are likely a vast underestimate owing to the paucity of eam" tags in Hayden Creek, and failure to account for fluctuations in PITA ncy, which are likely lowest during high flow periods when traps are not ed.

ll that PITA efficiencies are EXTREMELY poor at LLR.

Operational Summaries: PIT Tag Arrays

ocation	Code	Installation Date	Downtime (Days)	%Operation	Chinook efficiency	Steelhead Efficiency
n Upstream	ZEN A0	3/12/2009	3	99.6%	32%	40%
Downstream	ZEN B0	3/12/2009	0	100.0%		
R Upstream	ESS A0	3/26/2009	1.25	99.8%	39%	44%
Downstream	ESS B0	8/6/2009	9	98.3%		
SFSR (LSRCP)	KRS	2/26/2008	5	99.5%	N/A	N/A
ver SFSR	SFG	9/29/2009	4.7	99.0%	N/A	N/A
ek Upstream	TAY A0	9/1/2010	0.5	99.6%	N/A	N/A
k Downstream	TAY B0	9/1/2010	0.5	99.6%		
eek Upstream	VC1	8/15/2010	0.5	99.7%	72%	N/A
ek Downstream	VC2	8/16/2010	0.5	99.7%		
er Lemhi	LLR	8/18/2009	0	100.0%	1%	6%
er Lemhi	LRW	8/18/2009	19	96.3%	25%	63%
den Creek	HYC	8/24/2009	11	97.8%	64%	58%

2009-2010 Adult Steelhead Tributary Estimates

Stream	Method	Estimates	Array Efficiency
Asotin Creek	Weir	**1415** (1296-1536)	
Potlatch River	PIT Array	**778** (602-993)	
Rapid River	Weir	**134** (125-143)	
Fish Creek	Weir	**235** (176-294)	
South Fork Salmon	PIT Array	**1870** (1778-1962)	0.87
Secesh River	PIT Array	**234** (198-270)	0.77
E. Fk SFK Salmon	PIT Array	**545** (519-572)	0.98
Big Creek	PIT Array	**1174** (81-2267)	0.39
Lemhi River	PIT Array	**574** (502-645)	0.91
Valley Creek	PIT Array	**239** (194-285)	0.71
Sawtooth	Weir	**133** (122-144)	

2010 Chinook Run Array Estimates (Preliminary)

	PIT Tags				
y	ALL	ISMEP	Estimate ISEMP	Efficiency	Estimate
r South Fork on(SFG)	1054	255	280	0.67	7,005 (6655-7355)
sh River (ZEN)	138	48	52	0.78	1,308 (1165-1451)
S. FK Salmon (ESS)	179	41	41	0.96	1,026 (1015-1038)
r South Fork Salmon)	963	138	212	0.52	3,450 (2731-4169)
r Lemhi River (LLR)	32	7	10	0.67	262 (243-281)
en Creek (HYC)	11	3	-	-	-
r Lemhi River (LRW)	23	4	-	-	-
reek (TAY)	23	7		0.61	285 (160-411)
y Creek (VC)	31	7	9	0.74	235 (191-281)

Notes:

1) ESS estimates – Supp Fish = 558, Supp fish at JC Weir = 490

Conclusions

Utilizing PIT Tags – Across Different Spatial Scales for Juvenile and Adult Performance Measures

- Population - Tributary
- Major Population Group
- ESU/DPS – Largest Scale

Conclusions

Utilizing PIT Tags – Across Different Spatial Scales for Juvenile and Adult Performance Measures

- All methods have limitations
- PIT Tags –Common Currency
- Currently marking representatively
- PIT Arrays great addition to tool box

Acknowledgments

ISEMP
Integrated Status & Effectiveness Monitoring Program

NEZ PERCE TRIBE
TREATY OF 1855

NEZ PERCE
FISHERIES

QCInc.
Quantitative Consulting Inc.

Bonneville
Power Administration

3D9.1BF2328B20
3D9.QBF1641BB4
3D9.1UF1955DD2
3D9.1B E 1970B60
3D9.1BFS 971444
3D9.1BF1T E288A
3D9.1BF1A I 1964
3D9.1BF232OD0D
3D9.1BF2330 N F0
3D9.1BF236AFS8
3D9.1BF23884D ?