

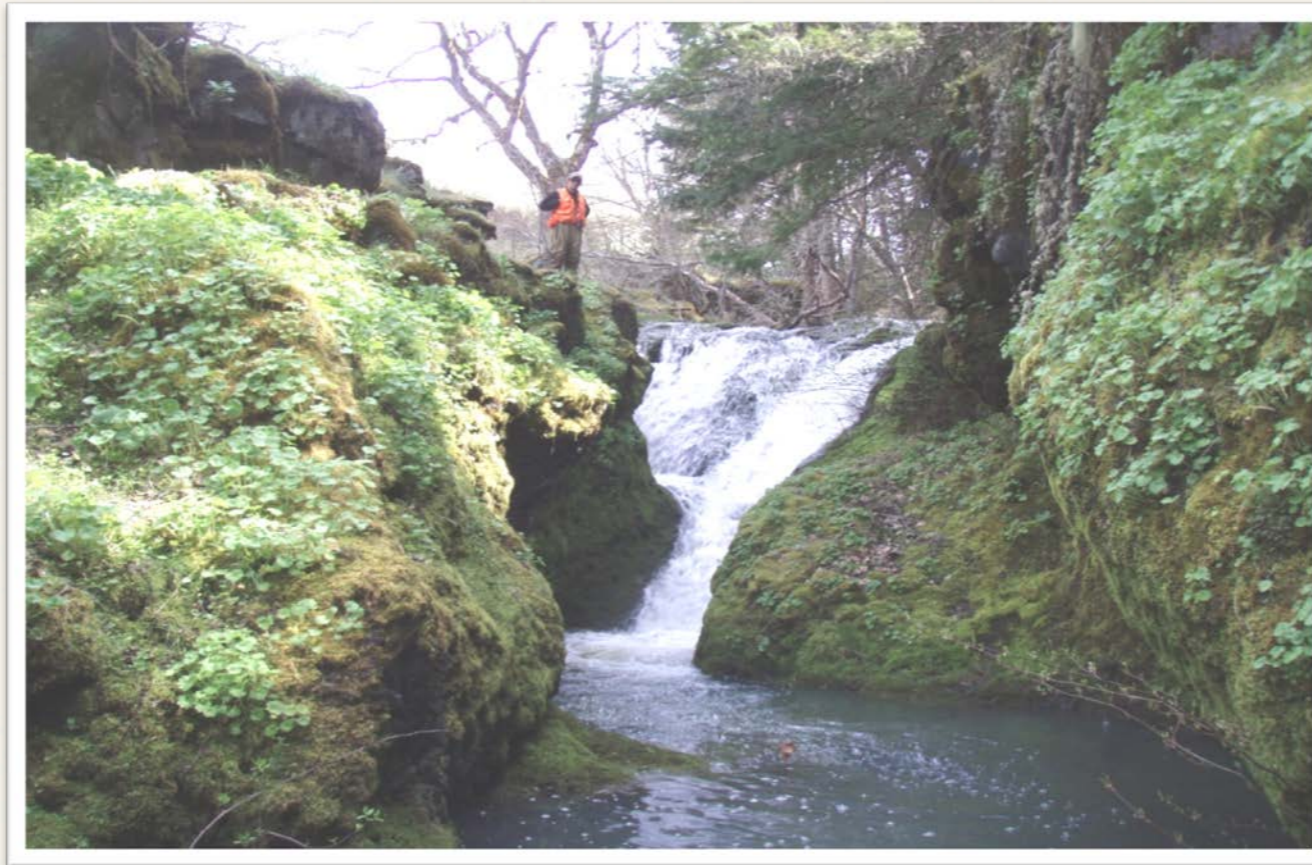


Yakama Nation Fisheries
Yakama Klickitat Fisheries Project



Columbia River Inter-Tribal Fish Commission
Tribal Data Network

Automating Stream Inventory Data Entry



Mike Babcock, Klickitat Data Manager, Yakama Nation Fisheries

Nicole Tursich, Database Administrator, Columbia River Inter-Tribal Fish Commission





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Presentation Outline

- Rapid Aquatic Habitat Assessment Protocol (RAHAP)
- Application Development



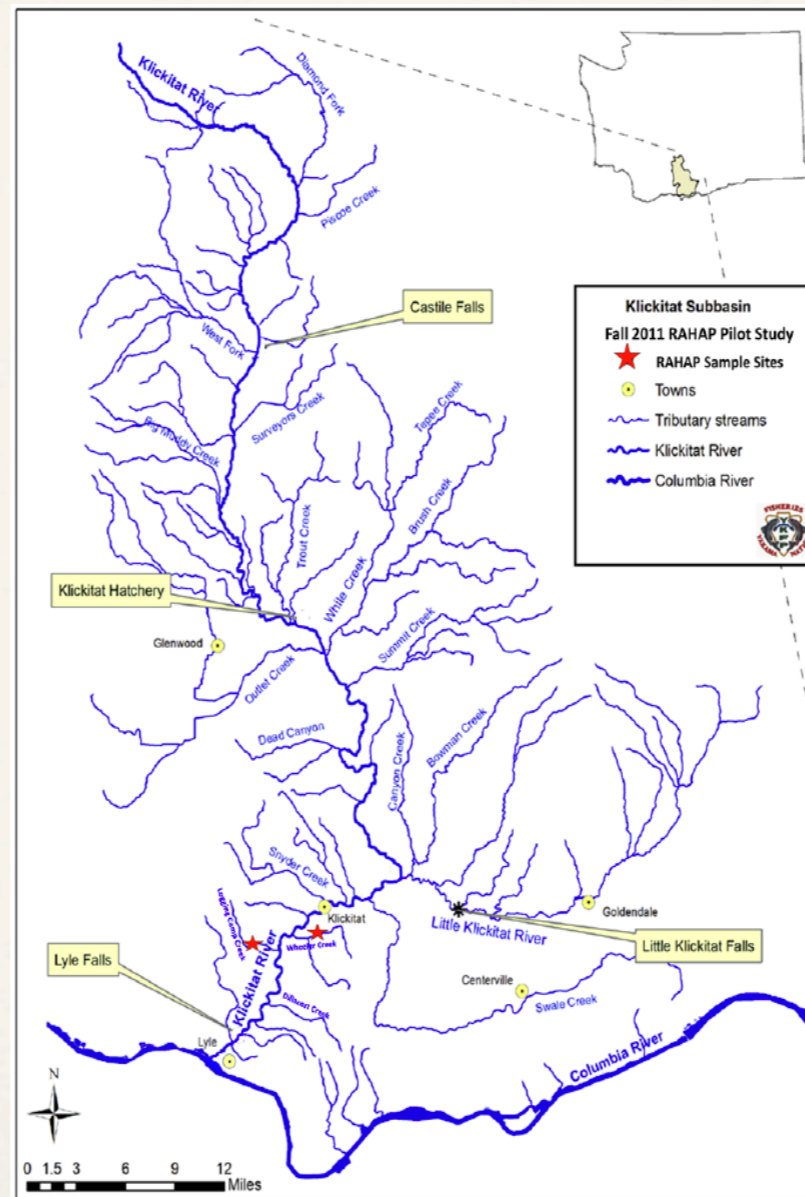


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The Rapid Aquatic Habitat Assessment Protocol (RAHAP) Study Area





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The Rapid Aquatic Habitat Assessment Protocol (RAHAP) Methodology

Geomorphic Reach

Tributary Junction
Waterfalls/Barriers
Valley Transitions

Additional Surveys georeferenced to Habitat Units

Wood Piece Survey
Debris Jam Survey
Spawn Patch Survey
Bedrock Feature Survey

Geomorphic Channel Habitat Unit Surveys

Pool
Glide/Run
Cascade/Rapid/Riffle

Fish Abundance Survey

Single-pass electrofish

Pool - 100%
Glide - 50% sampled
Cascade/Riffle - 33% sampled
PIT-TAG fish

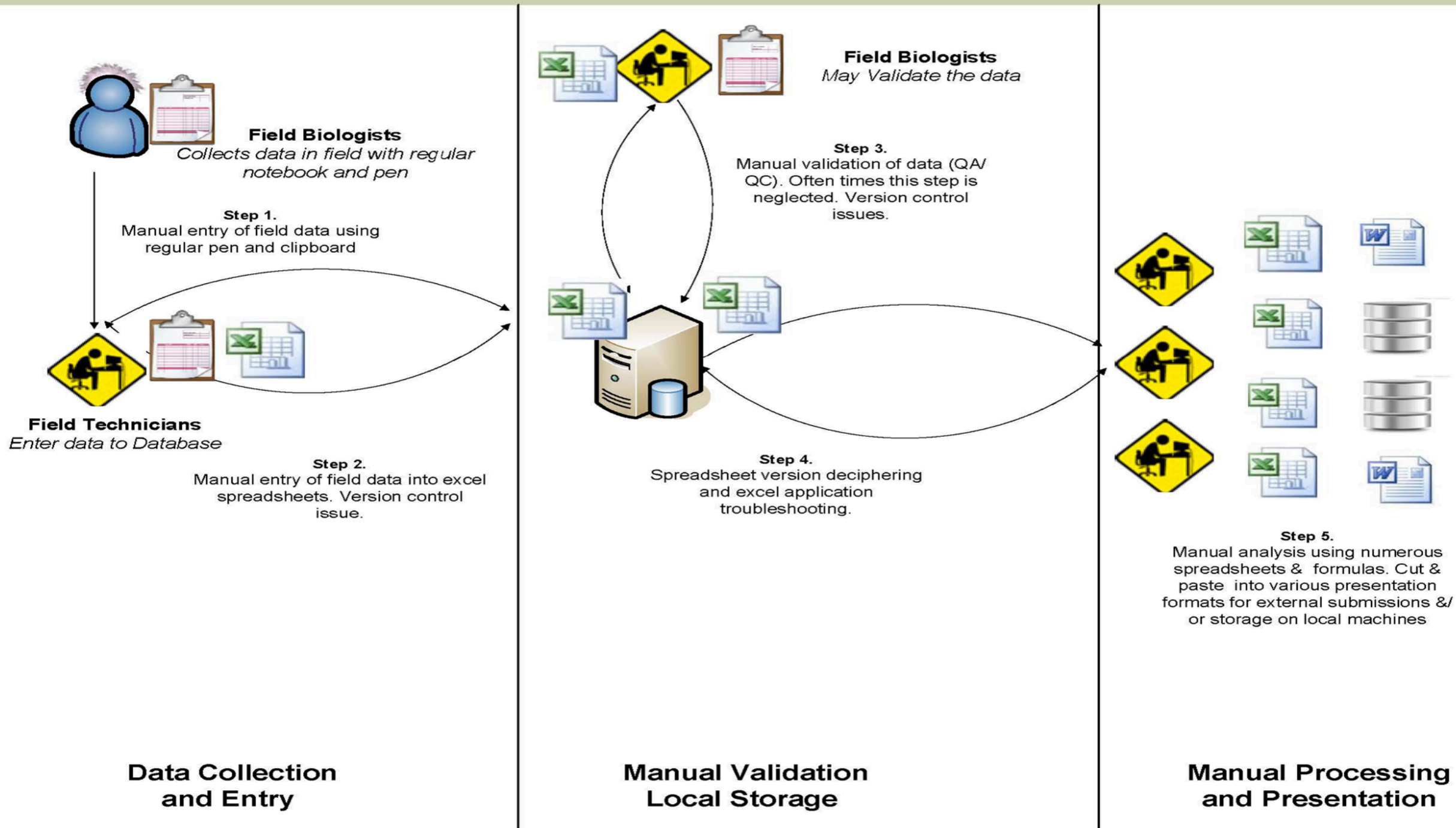




YKFP

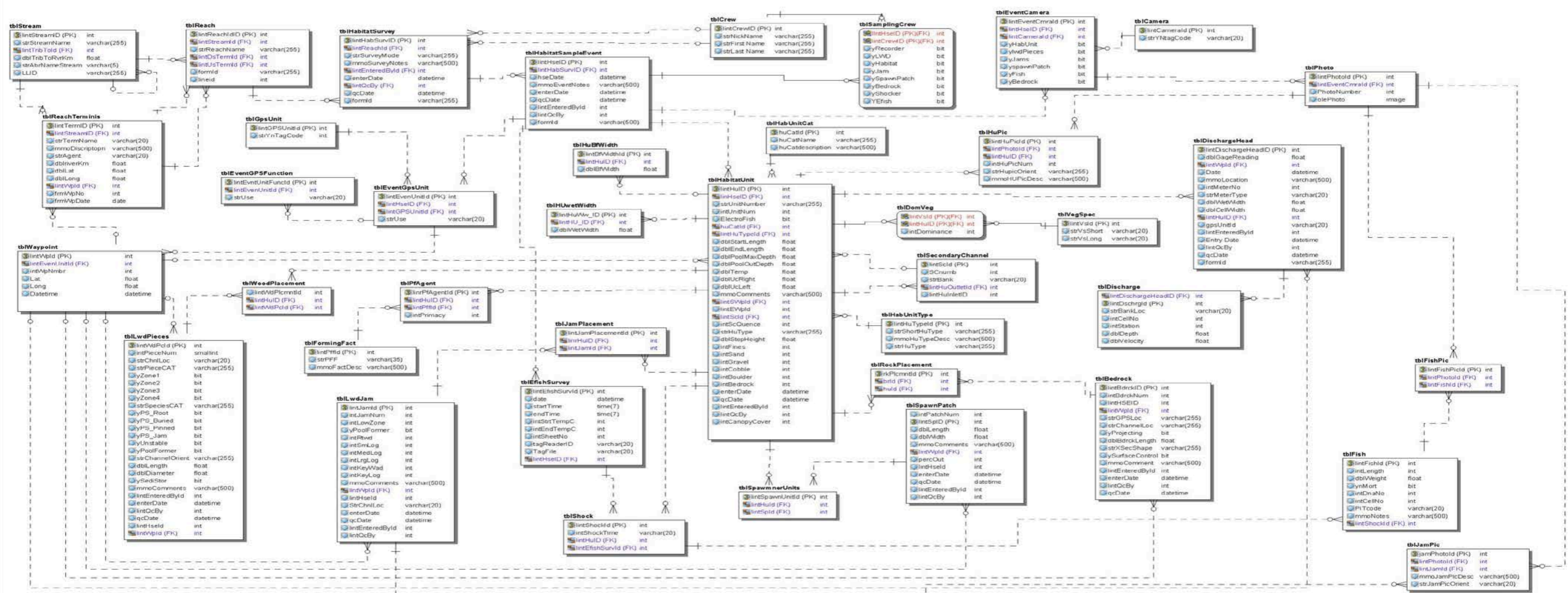
RAHAP – Prehistoric Dysfunctional Diagram

Klickitat River Research, Monitoring & Evaluation Project & Watershed Enhancement Project



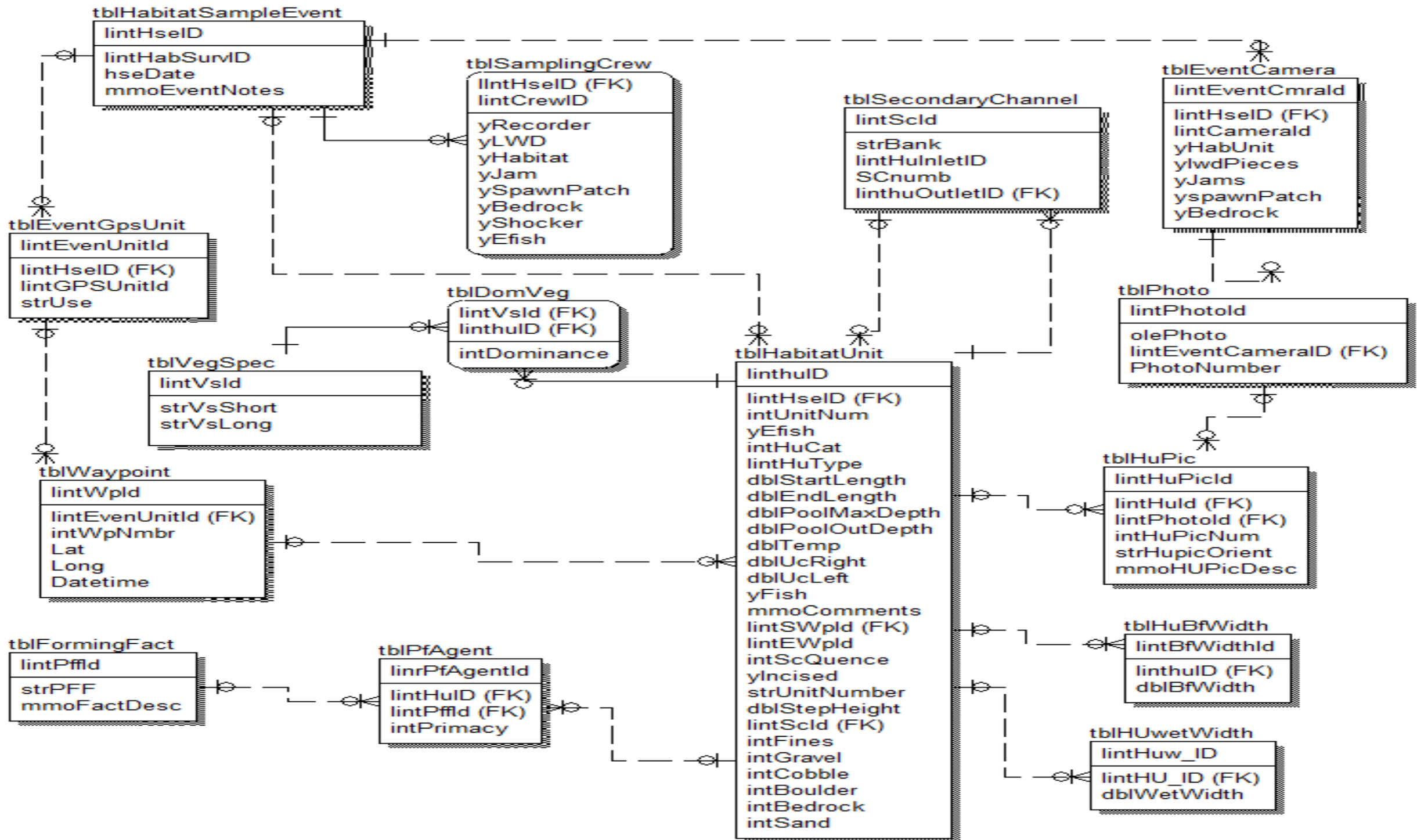


Physical Data Model





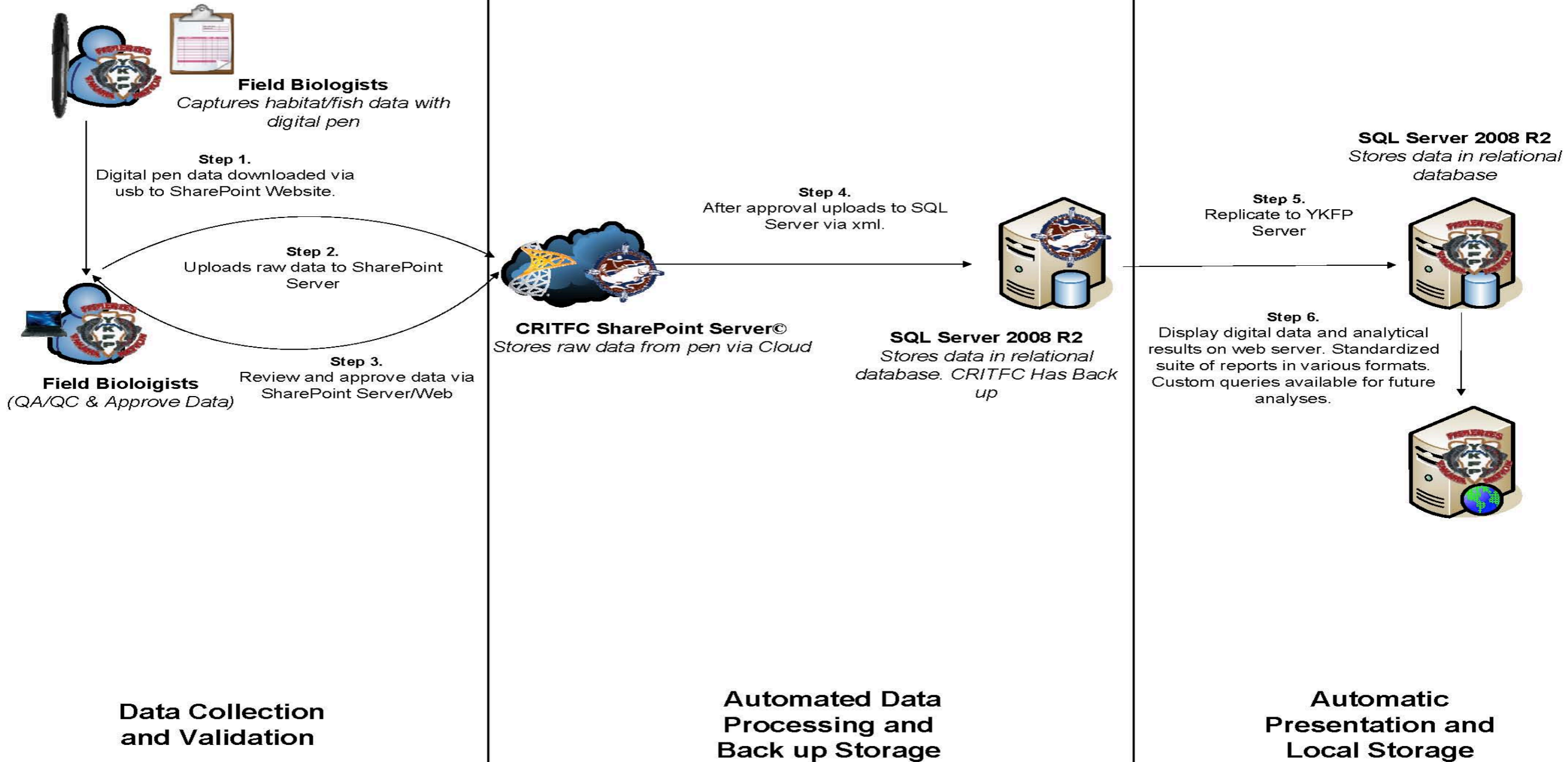
Habitat Unit Resolution





YKFP RAHAP-Functional Diagram

Klickitat River Research, Monitoring & Evaluation Project & Watershed Enhancement Project





Magic Pen



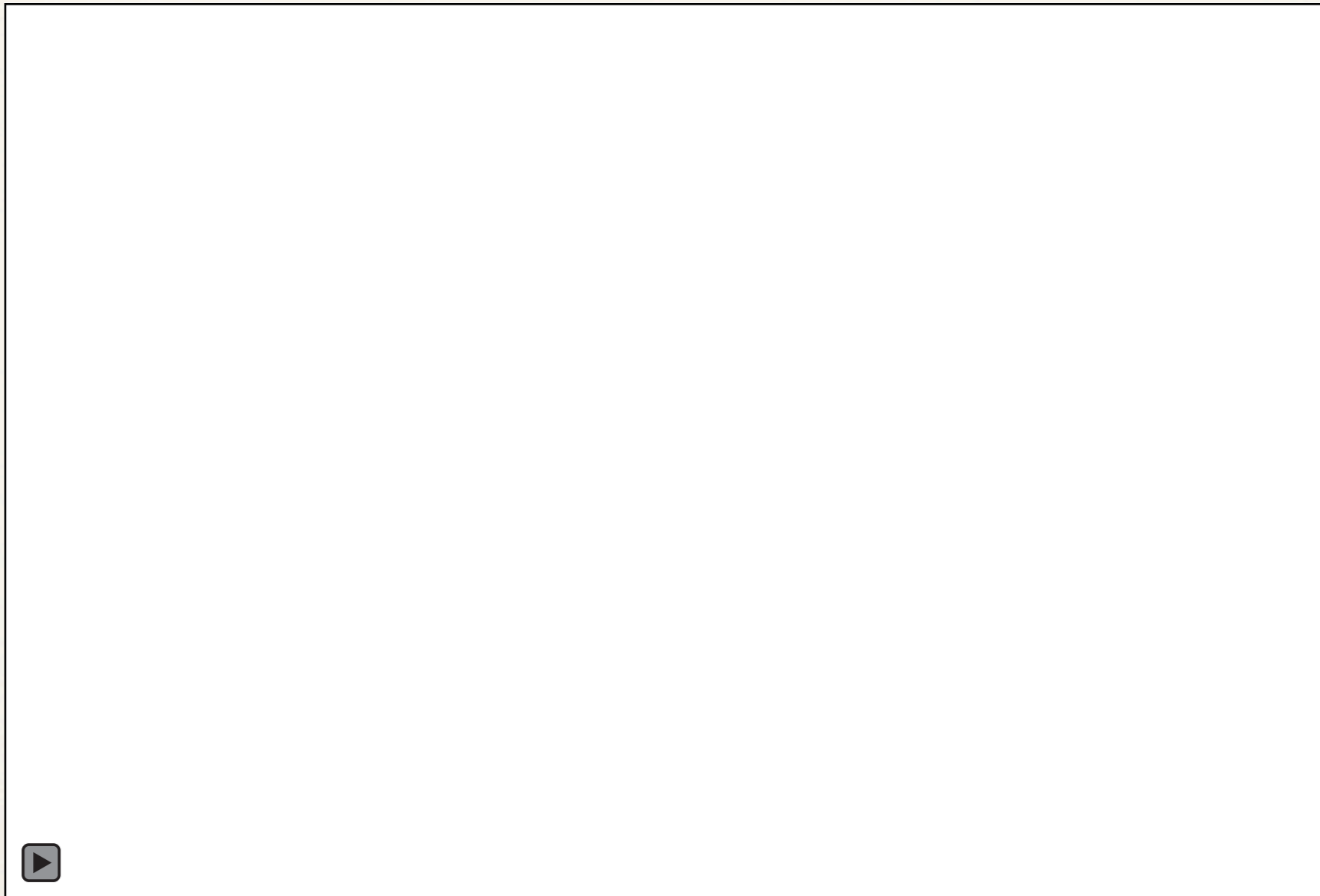


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“Magic” Pen in water



YKFP RAHAP Habitat Unit Survey Form A



Stream Name: Deaks Canyon Creek

Reach: 730.0km - 461.2km

Date: 5/01/17



Unit #	Unit Type	CAT	side channel				Unit GPS WP	Start Length	End Length	Wet Width				Pool				Bankfull Width	Slope	Field Notes
			SC Bank (L/R)	SC Inlet #	Unit	SC Inlet WP				Pool Max Depth	Pool Min Depth	Pool Form A	Pool Form B							
1	GL	1				104	0.0	4.1	2.5	2.4					5.9			Started 40m above confluence		
2	RF	1				105	4.1	8	1.1	1.8					2.3			W/D Bedrocked by Kikichik K.		
3	GL	1				106	4.3	14.1	2.1	1.4					3.5					
4	RF	1				107	14.1	30.7	2.3	4.1					7.7	8.1		Just Red wing Spar		
5	PL	1				108	30.7	36.7	2.3	2.2					8.4					
6	RF	1				109	36.7	123.7	2.3	2.1	2.1	1.2	2.8	2.8	9.0	3.3	9.5			
7	PL	1				110	123.7	129.1	3.2	2.4					0.35	0.05	05			
8	RF	1				111	129.1	161.0	2.4	4.2	8.0				5.3			Not a Sample Unit		
9	CA	1				112	161.0	178.3	2.1	2.0					6.2					
10	PL	1				113	178.3	192.1	2.9						0.44	0.10	05			
11	RF	1				114	192.1	217.7	4.0	2.7	2.7				0.27	0.02	05			
12	PL	1				115	217.7	220.3	2.0						0.2	0.07	05			
13	CA	1				116	220.3	253.7	4.6	3.0					3.6	4.7				
14	PL	1				117	253.7	259.0	2.9	3.5					0.44	0.13	05			
15	CA	1				118	259.0	334.8	2.7	2.1	1.5	3.7	1.8		4.6	5.5				
16	PL	1				119	334.8	338.7	3.0	3.4					0.40	0.11	05	W/D 120		
17	RF	1				120	338.7	375.1	2.5	3.7	5.4				8.7					
18	CA	1				122	375.1	389.3	2.5	2.0					8.9					
19	RF	1				123	389.3	401.9	2.9	4.5					4.6					
20	PL	1				124	401.9	406.9	3.4						0.36	0.10	05			
21	RF	1				125	406.9	414.3	2.1	2.3					6.9	5.6				
22	GL	1				126	414.3	420.9	2.5	2.1					6.3					
23	RF	1				127	420.9	442.1	2.2	2.8	1.7				4.2	4.5				
24	GL	1				128	442.1	445.7	2.6	3.8	2.9				4.9					
25	RF	1				129	445.7	457.2	3.9	3.7					4.7	4.1				
26	OL	1				130	457.2	467.4	2.8	2.4					2.8					
															0.46	0.11	05			

Entered by: Entry Date: QA/QC by: QA/QC Date: Page: 1 of

YKFP RAHAP Habitat Unit Survey Form A



Stream Name:

Reach:

Date:



Unit #	Unit Type	CAT	side channel			Unit GPS WP	Start Length	End Length	Weir Width				Pool				Bankfull Width			Depth	Field Notes	
			SC Bank (L/R)	SC Inlet #	Unit				SC Inlet WP	1	2	3	4	Pool Max Depth	Pool Out Depth	Pool Form Angle A	Pool Form Angle B	1	2			3
1	GL	1				104	0	4.1	2.5	2.4								5.9				Started 40m above confluence
2	RP	1				105	4.1	8.3	1.1	1.8								7.3				H2O Backwatered by Klickitat R.
3	GL	1				106	8.3	14.1	2.1	1.4								7.3				
4	RP	1				107	14.1	30.7	2.3	4.7								7.7	8.1			Huel Rd Xing spans unit
5	PL	1				108	30.7	38.7	2.3	2.2				0.30	0.06	4		8.4				
6	RP	1				109	38.7	123.7	2.3	2.1	2.1	3.2	2.8	2.8				9.0	3.3	8.5		
7	PL	1				110	123.7	129.1	3.2	2.4				0.35	.005	5						
8	RP	1				111	129.1	181.0	2.4	4.2	8.0							8.3				Not a Sample unit.
9	CA	1				112	181.0	178.3	2.1	2.0								8.2				
10	PL	1				113	178.3	182.1	2.9					0.44	0.10	5		8.8				
11	RP	1				114	182.1	217.7	4.0	2.7	2.7							8.8	5.0	4.0		
12	PL	1				115	217.7	220.3	2.0					0.27	0.07	5		8.5				
13	CA	1				116	220.3	253.7	4.8	3.0								8.8	4.7			
14	PL	1				117	253.7	259.0	2.9	3.5				0.44	0.13	5		8.1	3.0			
15	CA	1				118	259.0	334.8	2.7	2.1	1.8	3.7	1.8					4.8	5.3			
16	PL	1				120	334.8	338.7	3.0	3.4				0.40	0.12	5		8.7				wpt 120
17	RP	1				121	338.7	375.1	2.5	3.7	5.4							8.9				
18	CA	1				122	375.1	384.3	2.5	2.8								4.8				
19	RP	1				123	384.3	401.9	2.7	4.5								8.9	5.8			
20	PL	2				124	401.9	408.9	3.4					0.38	0.10	5		8.3				
21	RP	2				125	408.9	414.3	2.1	2.3								4.2	4.5			
22	GL	1				126	414.3	420.9	2.5	2.1								4.9				
23	RP	1				127	420.9	442.1	2.2	2.8	1.7							4.7	4.2			
24	GL	1				128	442.1	445.7	2.8		2.9							5.8				
25	RP	1				129	445.7	457.2	3.9	3.7								5.7	5.9			
26	PL	1				130	457.2	463.4	2.5	2.4				0.46	0.11	5		4.4				

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Entry Date:

QA/QC by:

QA/QC Date:

Page: of





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Programming

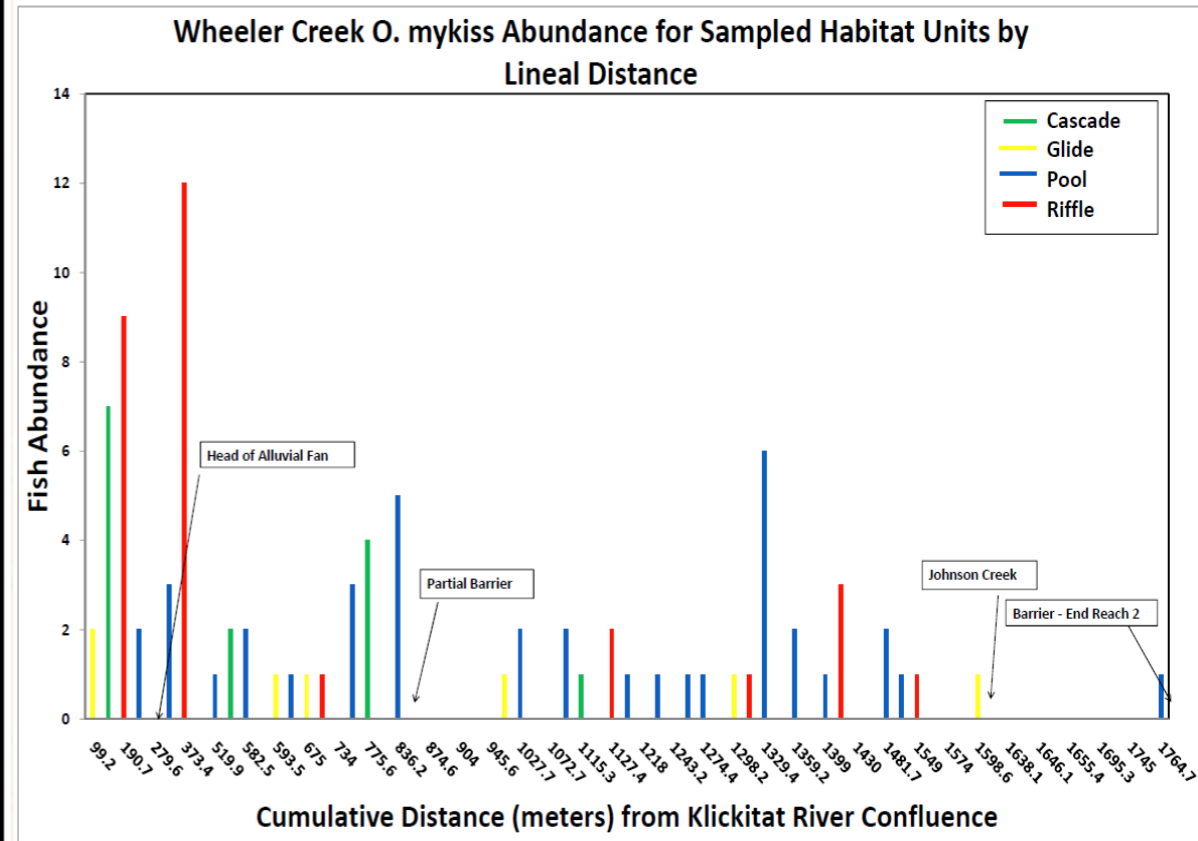
- Convert xml data from SharePoint Server 2010 to arrays
- Export xml arrays to server containing SQL Server R2 2008 using Visual Studio 2008, C# and ASP.NET website
- Create stored procedures in SQL Server R2 2008 using Transact SQL for importing arrays to relational database
- Automated reports and products from a single relational database





Automated Results

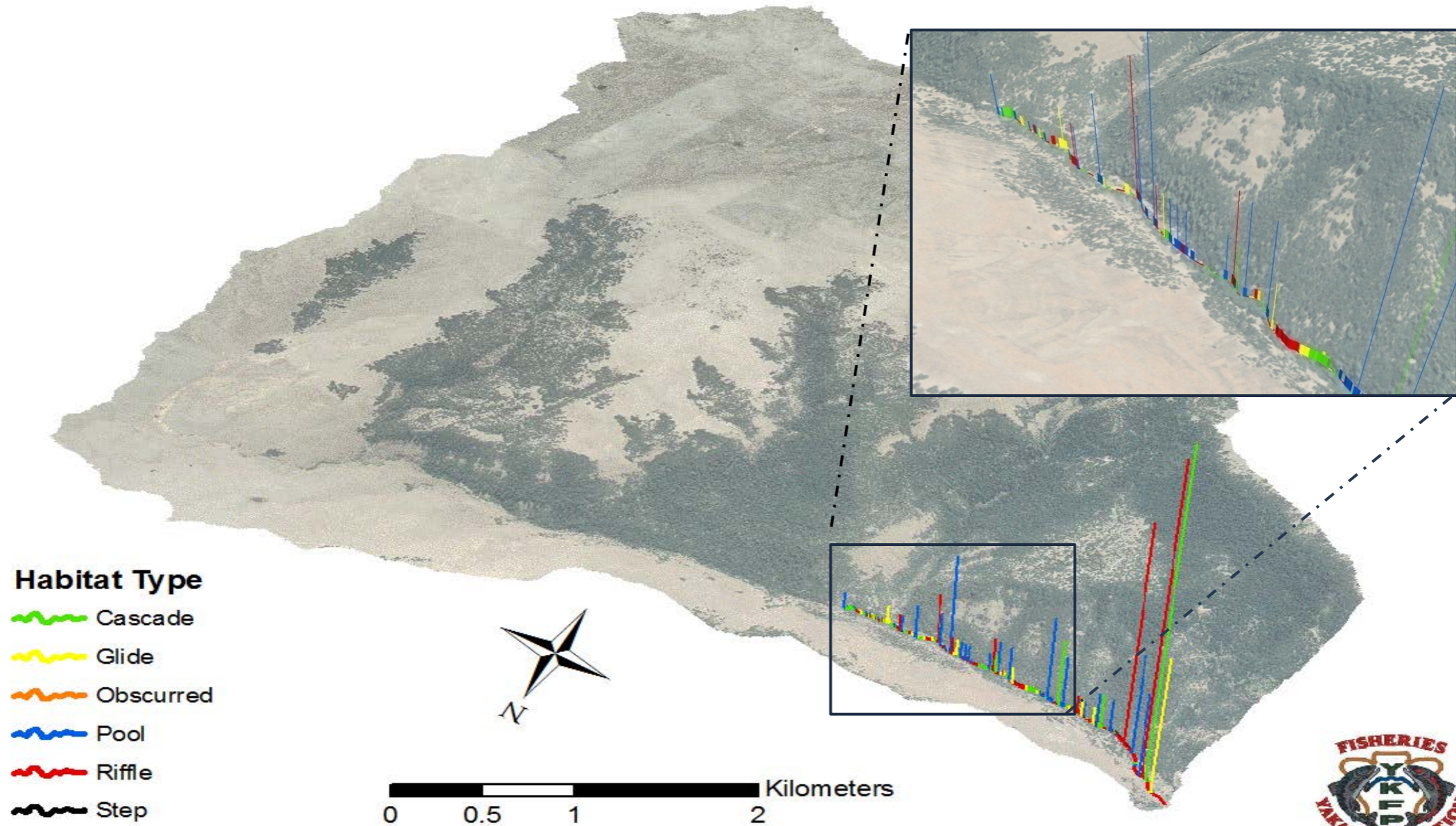
	Logging Camp Ck	Wheeler Ck
Drainage Area	12.1 km ²	9.7 km ²
Elevation	103-244 m (<i>Sample Area</i>) 103-732 m (<i>Watershed</i>)	116-207 m (<i>Sample Area</i>) 116-671 m (<i>Watershed</i>)
Total Length Surveyed (km)	1.9	1.8
Side Channel Length (m)	58.2	87
Avg. Wetted Width (m)	3.3	4
Avg. Bankful Width (m)	4.5	8.1
Avg. Habitat Unit Area (m ²)	39.1	58.7
Pools per km	20	18
Avg. Max Pool Depth (m)	0.53	0.83
Avg. Residual Pool Depth (m)	0.33	0.51
Total Spawning Area (m ²)	49.8	37.7
Bedrock Outcrops per km	3	17
LWD Pieces per km	49	28
Volume of LWD (m ³) per km	46.13	14.57





Automated Data Products

Oncorhynchus mykiss Abundance by Habitat Type: Wheeler Creek





Yakama Nation Fisheries
Yakama Klickitat Fisheries Project



Columbia River Inter-Tribal Fish Commission
Tribal Data Network

Awknowledgements



David Lindley, Nicolas Romero, and Will Conley YKFP



Henry Franzoni, CRITFC Tribal Data Steward



Confederated Tribes and Bands of the Yakama Nation



Bonneville Power Administration



Adapx- Capturx Digital Pen Software for SharePoint





Yakama Nation Fisheries
Yakama Klickitat Fisheries Project



Columbia River Inter-Tribal Fish Commission
Tribal Data Network

Advantages

- ✍ Paper trail - paper copy and electronic copy
- ✍ Reduces error - Provides simplified system for QA/QC
- ✍ Improves timeliness and accuracy of data collection, entry and processing
- ✍ Provides archival record of approved data entry and edits
- ✍ Maintains consistent data-restrictions on what data is accepted (valid values)
- ✍ Data is stored in relational database on approval and backed up to several locations.

