



Yakama Nation Fisheries
Yakama Klickitat Fisheries Project



Columbia River Inter-Tribal Fish Commission
Tribal Data Network

Automating Stream Inventory Data Entry



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Presentation Outline

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



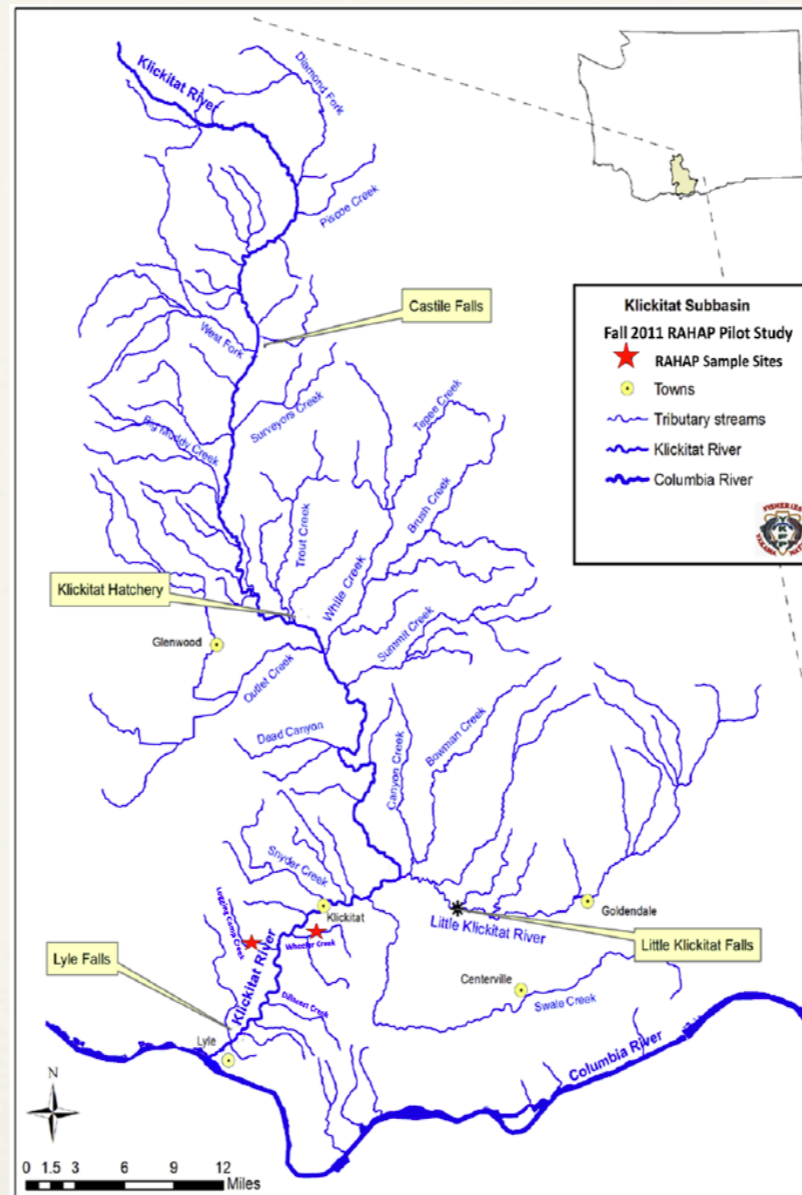


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The Rapid Aquatic Habitat Assessment Protocol (RAHAP) Study Area





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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

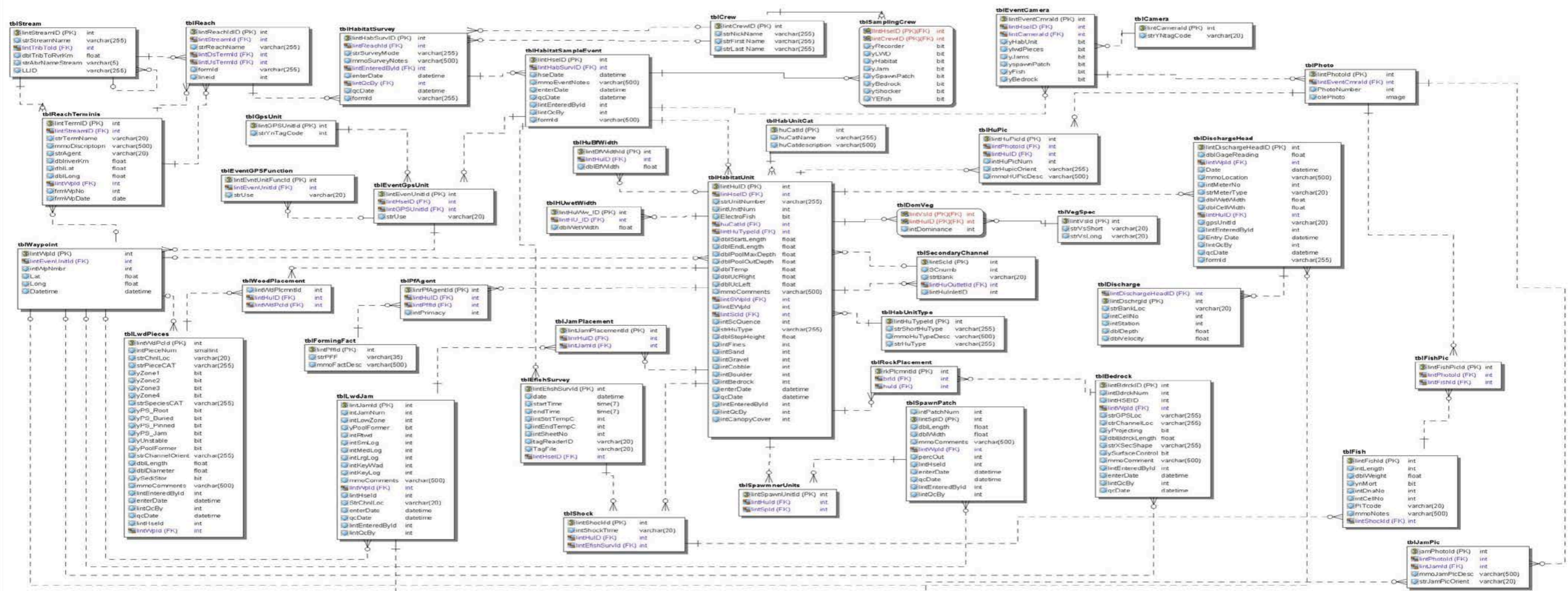
Single-pass electrofish

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



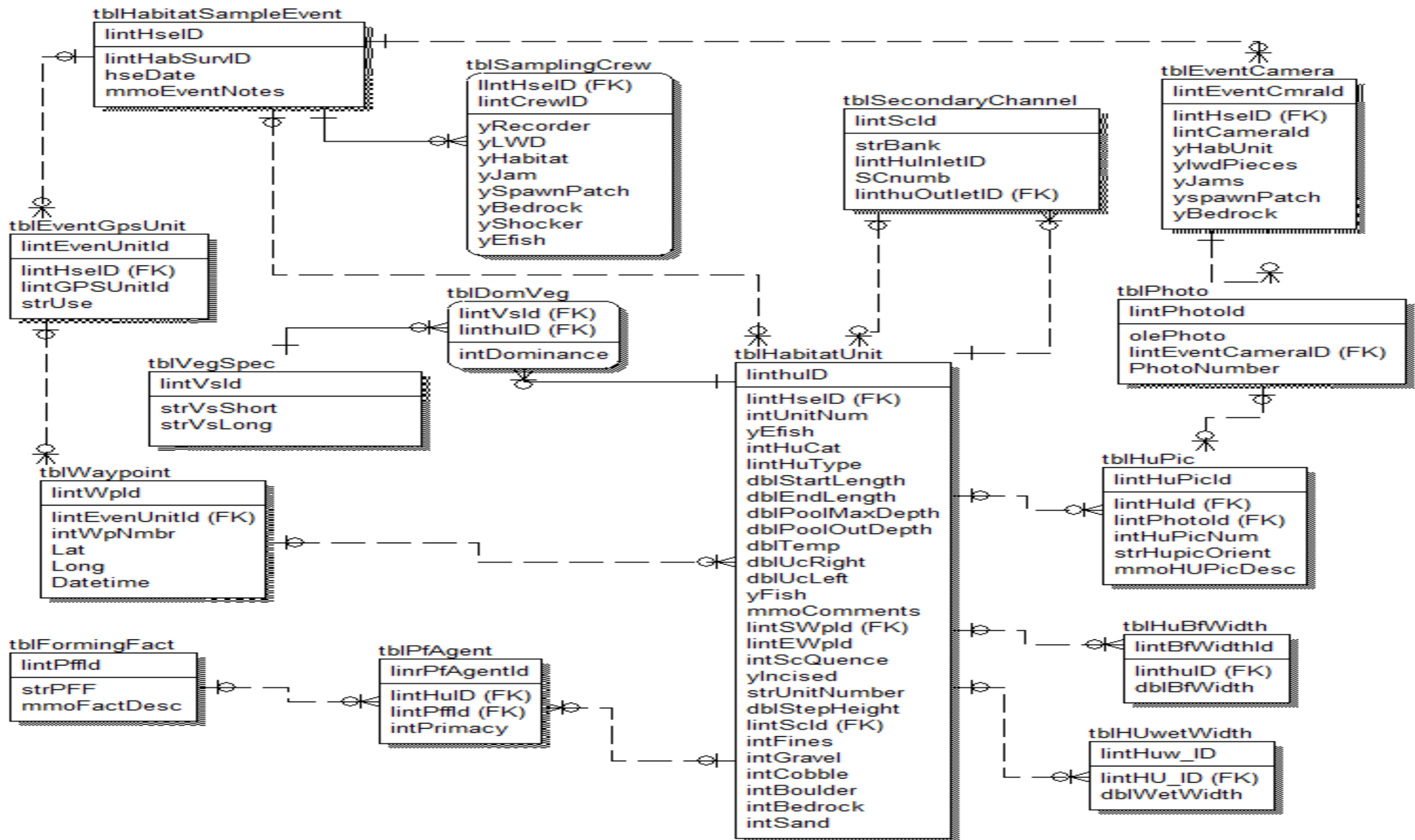


Physical Data Model





Habitat Unit Resolution

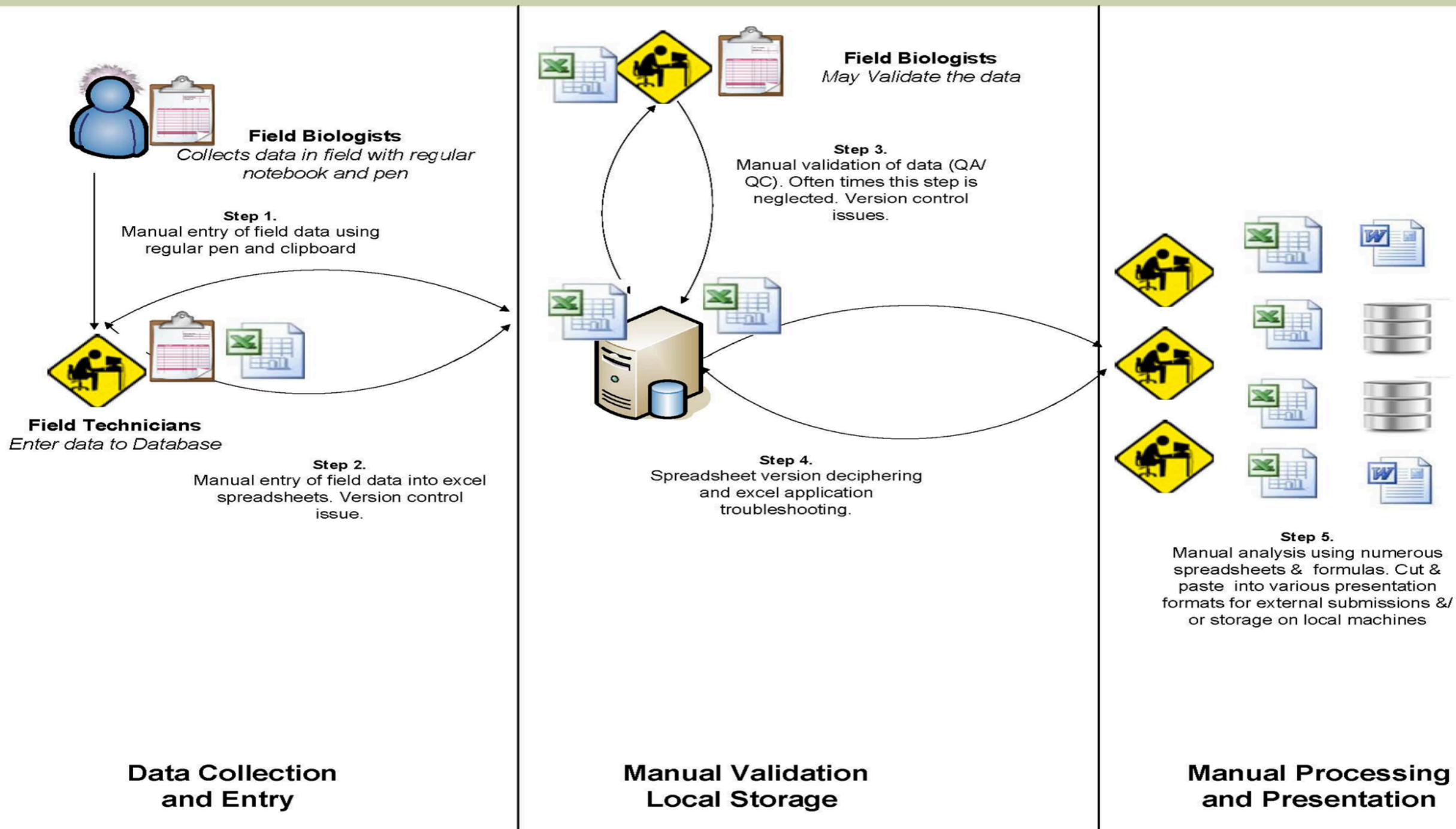




YKFP

RAHAP – Prehistoric Dysfunctional Diagram

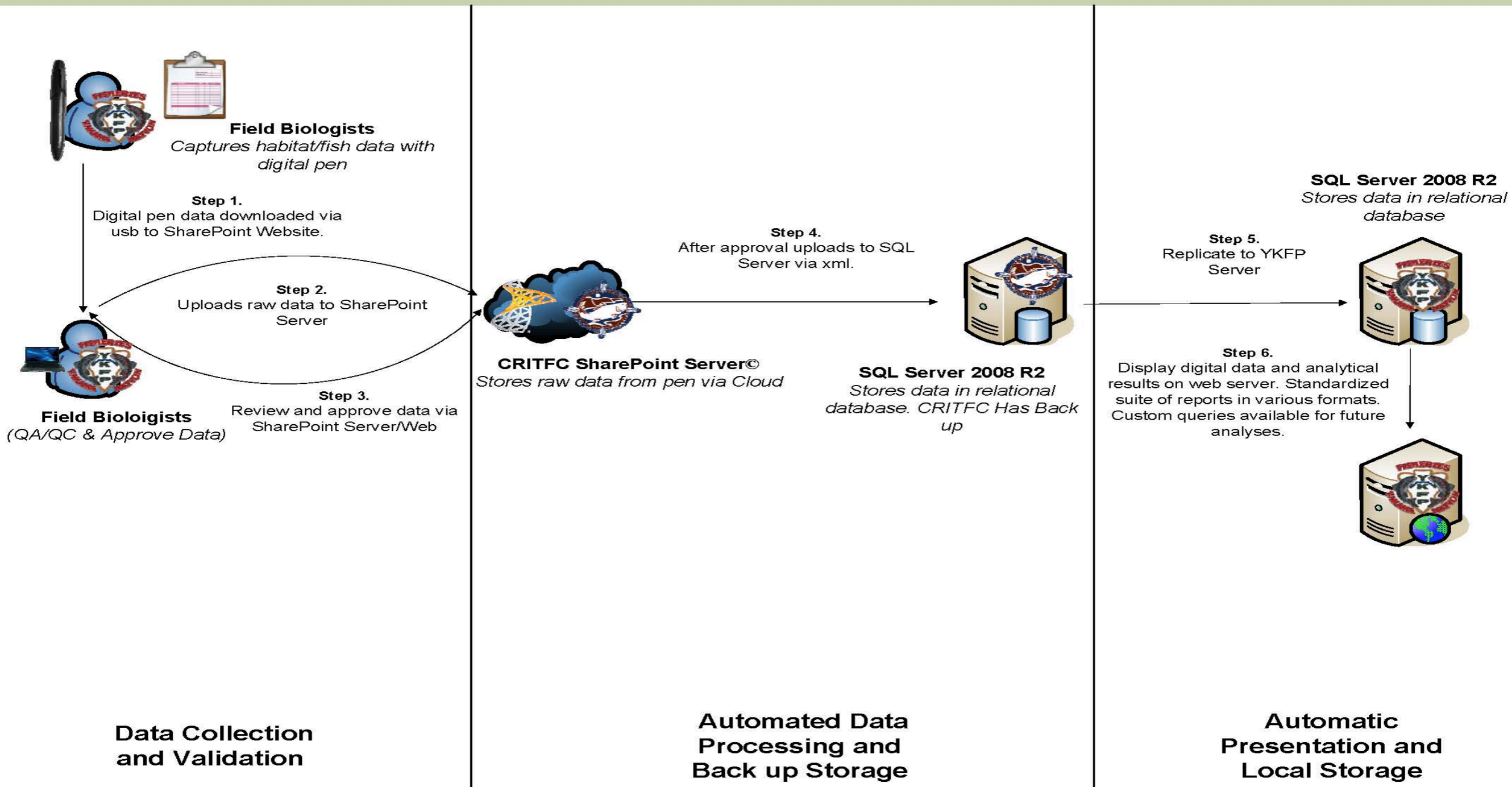
Klickitat River Research, Monitoring & Evaluation Project & Watershed Enhancement Project





YKFP RAHAP-Functional Diagram

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





Magic Pen





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Data Validation

https://crt.critfc.org/critfc/YakamaHabitat/Lists/A_YKFP_RAHAP_Habitat_Unit_Survey_Form/AllItems.aspx

https://crt.critfc.org/critfc/YakamaHabitat/Lists/A_YKFP_RAHAP_Habitat_Unit_Survey_Form/CapturxEditForm.aspx?ID=2&Source=https%3A%2F%2Fcrt.critfc.org%2Fcritfc%2FYakamaHabitat%2FLists%2FA_YKFP_RAHAP_Habitat_Unit_Survey_Form%2FAllItems.aspx





Ink View

YKFP RAHAP Habitat Unit Survey Form A

Stream Name: Beaks Canyon Creek

Reach: 730.0km - WF 1.2km

Date: 5/01/12



Unit #	Unit Type	CAT	side channel			Unit GPS WP	Start Length	End Length	Wet Width				Pool				Bankfull Width	Step Height	FieldNotes	
			SC Bank (L/R)	SC Inlet #	Unit				SC Inlet WP	Pool Max Depth	Pool Out Depth	Pool Form Agent A	Pool Form Agent 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	8.0	1.1	1.8					7.3		H ₂ O Bedwatered by Klickitat R.			
3	GL	1				106	4.3	14.1	2.1	1.4					7.5					
4	RF	1				107	14.1	30.7	2.3	4.0					7.7	8.1	Pool Rd King Sp.			
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	3.2	2.8	2.4	0.30	0.06	04	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	182.1	2.9						0.44	0.10	05	5.6		
11	RF	1				114	182.1	217.7	4.0	2.7	2.7				0.27	0.07	05	5.8	6.0	9.0
12	PL	1				115	217.7	220.3	2.0						0.20	0.07	05	6.5		
13	CA	1				116	220.3	253.7	4.6	3.0					0.44	0.13	05	5.6	4.7	
14	PL	1				117	253.7	259.0	2.9	3.5					0.44	0.13	05	5.1	8.0	
15	CA	1				118	259.0	334.8	2.7	2.1	1.5	3.7	1.8					4.6	5.3	
16	PL	1				119	334.8	338.7	3.0	3.4					0.40	0.12	05	8.7		WF 120
17	RF	1				120	338.7	375.1	2.5	3.7	5.4							5.9		
18	CA	1				121	375.1	384.3	2.5	2.0								4.6		
19	RF	1				122	384.3	401.9	2.7	4.5								6.9	5.6	
20	PL	1				123	401.9	406.9	3.4						0.36	0.10	05	6.3		
21	RF	1				124	406.9	414.3	2.1	2.3								4.2	4.5	



Text View

YKFP RAHAP Habitat Unit Survey Form A

Stream Name:

Reach:

Date:



Unit #	Unit Type	CAT	side channel			Unit GPS WP	Start Length	End Length	Wet Width				Pool				Bankfull Width	Step Height	FieldNotes
			SC Bank (L/R)	SC Inlet #	Unit SC Inlet WP				Pool Max Depth	Pool Out Depth	Pool Form Agent A	Pool Form Agent B							
1	GL	1		w		104	0	4.1	2.5	2.4					5.9			Started 40m above confluence	
2	RF	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					7.5				
4	RF	1				107	14.1	30.7	2.3	4.7					7.7	8.1		Hual Rd Xing spans unit	
5	PL	1				108	30.7	36.7	2.3	2.2			0.30	0.06	4				
6	RF	1				109	36.7	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	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				
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12	PL	1				115	217.7	220.3	2.0					0.27	0.07	5			
13	CA	1				116	220.3	253.7	4.6	3.0					5.6	4.7			
14	PL	1				117	253.7	259.0	2.9	3.5				0.44	0.13	5			
15	CA	1				118	259.0	334.8	2.7	2.1	1.5	3.7	1.8		4.6	5.3			
16	PL	1				120	334.8	338.7	3.0	3.4				0.40	0.12	5		wpt 120	
17	RF	1				121	338.7	375.1	2.5	3.7	5.4				5.9				
18	CA	1				122	375.1	384.3	2.5	2.6					4.6				
19	RF	1				123	384.3	401.9	2.7	4.5					6.9	5.6			
20	PL	2				124	401.9	406.9	3.4					0.36	0.10	5			
21	RF	2				125	406.9	414.3	2.1	2.3					4.2	4.5			



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Programming

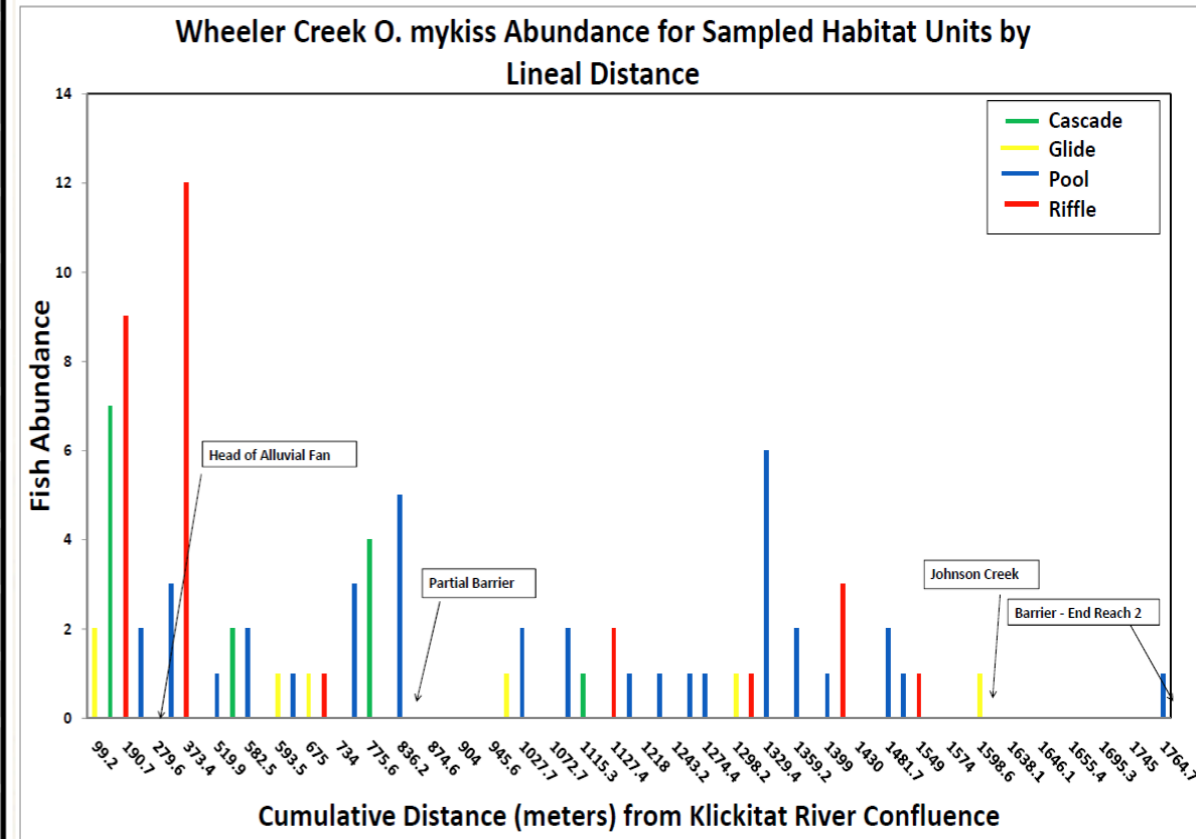
- Convert xml data from SharePoint Server 2010 to arrays
- Export xml arrays to server containing SQL Server R2 2008 using Visual Studio 2008, C# and ASP.NET website
- Create stored procedures in SQL Server R2 2008 using Transact SQL for importing arrays to relational database
- Automated reports and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





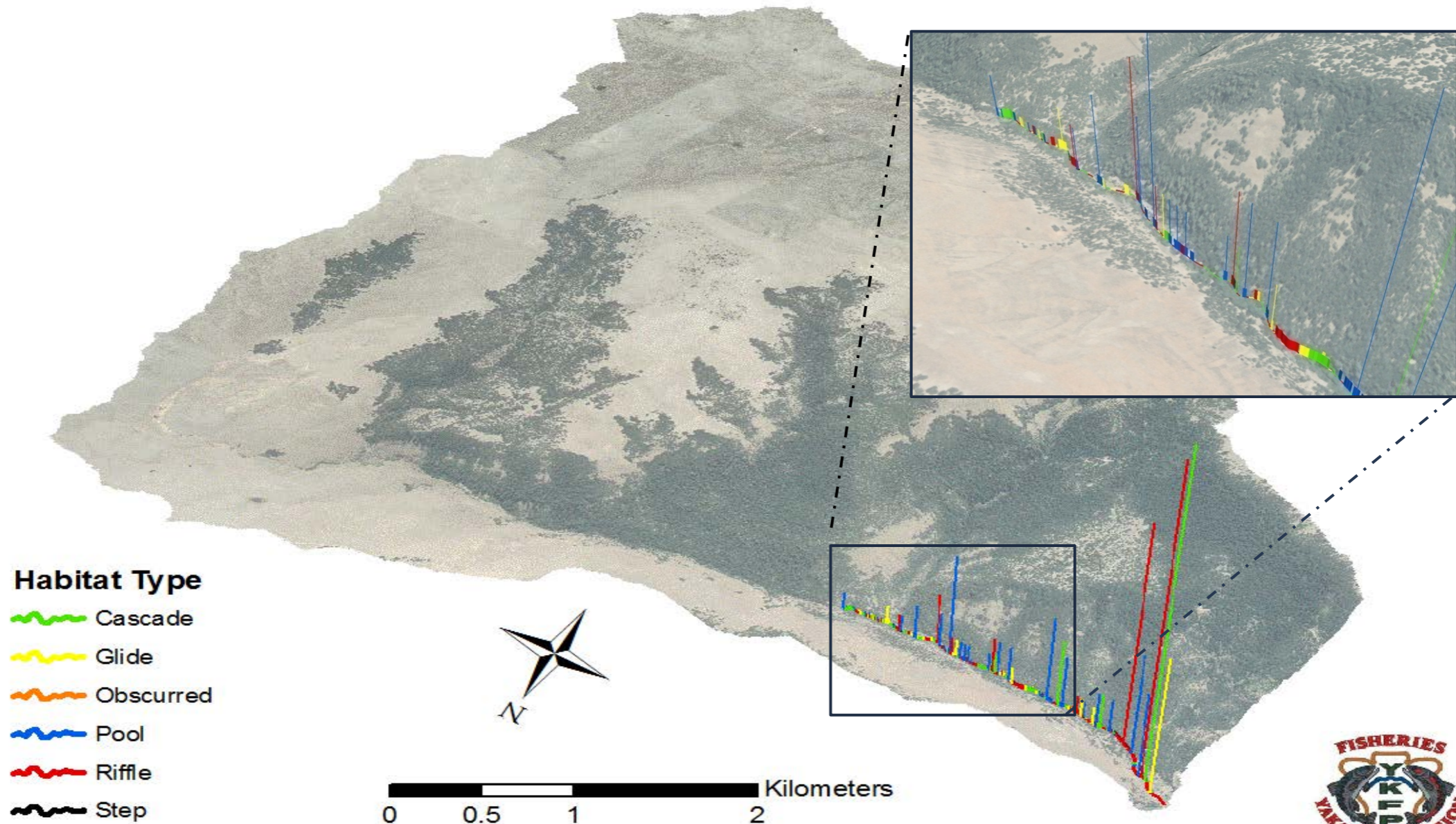
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Automated Data Products

Oncorhynchus mykiss Abundance by Habitat Type: Wheeler Creek





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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.





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Awknowledgements



David Lindley, Nicolas Romero, and Will Conley YKFP



Nicole Tursich & Henry Franzoni, CRITFC Tribal Data Network



Confederated Tribes and Bands of the Yakama Nation



Bonneville Power Administration



Adapx- Capturx Digital Pen Software for SharePoint

