Testing the Feasibility of Converting the Data of a Habitat Model into a Relational Geodatabase

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Subbasin Planning

- In 2001, the Northwest Pacific Power Conservation Council called for subbasin plans to be completed by May of 2004 and adopted into the Council's Columbia River Basin Fish and Wildlife Program to guide migration funding from Bonneville Power Administration's hydropower complex. www.nwcouncil.org
- Technical Outreach and Assistance to Subbasin Teams (TOAST) was responsible for assisting in the planning process, mainly fish and wildlife modeling and restoration planning.

EDT

Ecosystem Diagnosis and Treatment

http://www.mobrand.com/edt

A tool used to analyze environmental information and draw conclusions about the ecosystem from the salmon's perspective.

Stream Reach Editor

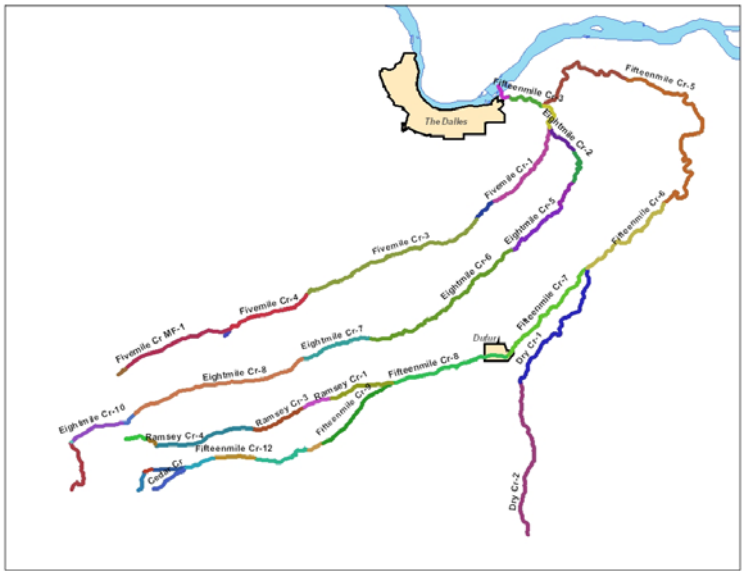
Attribute Code	Attribute Name	Data Type	Pattern by Month
FlwDielVar	Flow - Intra daily (diel) variation	0 to 4 rating	yes
FlwHigh	Flow - change in interannual variability in high flows	0 to 4 rating	yes
FlwIntraAnn	Flow - intra-annual flow pattern	0 to 4 rating	yes
FlwLow	Flow - changes in interannual variability in low flows	0 to 4 rating	yes
HydroRegimeNatural	Hydrologic regime - natural	0 to 4 rating	no
HydroRegimeReg	Hydrologic regime - regulated	0 to 4 rating	no
ChLngth	Channel length	miles	no
WidthMn	Channel month Minimum width (ft)	feet	yes
WidthMx	Channel month Maximum width (ft)	feet	yes
TmpMonMx	Temperature - daily maximum (by month)	0 to 4 rating	yes
TmpMonMn	Temperature - daily minimum (by month)	0 to 4 rating	yes
TmpSptVar	Temperature - spatial variation	0 to 4 rating	yes
Icing	Icing	0 to 4 rating	yes
HbSmlCbl	Habitat type - small cobble/gravel riffles	%	no
HbGlide	Habitat type - Glides	%	no
HbPls	Habitat type - primary pools	%	no
HbPITails	Habitat type - pool tailouts	%	no
HbBckPls	Habitat type - backwater pools	%	no
HbBvrPnds	Habitat type - beaver ponds	%	no
HbOfChFctr	Habitat type - off-channel habitat factor	%	no
Obstr	Obstructions to fish migration	yes or no	yes
Confine	Confinement - natural	0 to 4 rating	no
ConfineHydro	Confinement - Hydromodifications	0 to 4 rating	no
Grad	Gradient	%	no
BdScour	Bed scour	0 to 4 rating	yes
FnSedi	Fine sediment	0 to 4 rating	no
Embi	Embeddedness	0 to 4 rating	no
Turb	Turbidity	0 to 4 rating	yes
MscToxWat	Miscellaneous toxic pollutants - water column	0 to 4 rating	no
MetSedSls	Metals/Pollutants - in sediments/soils	0 to 4 rating	no
MetWatCol	Metals - in water column	0 to 4 rating	no
NutEnrch	Nutrient enrichment	0 to 4 rating	yes
DisOxy	Dissolved oxygen	0 to 4 rating	yes
Alka	Alkalinity	0 to 4 rating	no
BenComRch	Benthos diversity and production	0 to 4 rating	no
FshComRch	Fish community richness	0 to 4 rating	no
FSpIntro	Fish species introductions	0 to 4 rating	no
PredRisk	Predation risk	0 to 4 rating	yes
RipFunc	Riparian function	0 to 4 rating	no
WdDeb	Wood	0 to 4 rating	no
SalmCarcass	Salmon Carcasses	0 to 4 rating	no
HatFOutp	Hatchery fish outplants	0 to 4 rating	no
FshPath	Fish pathogens	0 to 4 rating	no
Harass	Harassment	0 to 4 rating	no
Wdrwl	Water withdrawals	0 to 4 rating	yes

Obstruction Data

Obstruction Type	Scenario	Species	Life Stage	Direction	Pattern by Month
Waterfall	T	Chinook	0 age Fingerling	Upstream	Jan to Dec
Dam	P	Steelhead	1 age Juvenile	Downstream	
Culvert		Coho	2+ age Juvenile		
Flow Diversion			Adult		
Irrigation Diversion			Emergent Fry		

Fifteenmile Subbasin

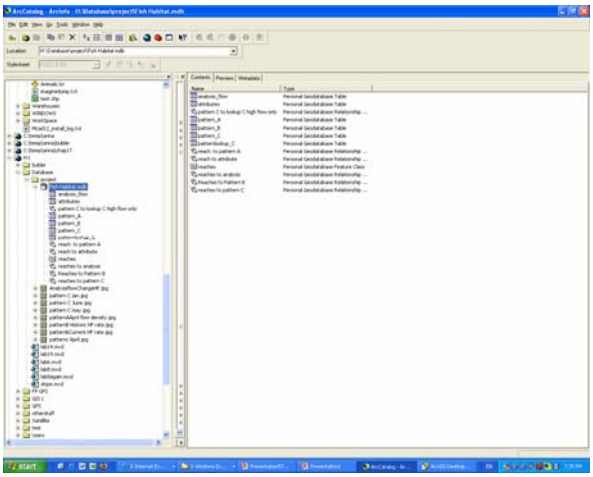
Reaches



Techniques

Relationship Class

Geodatabase relationship classes are usually created to establish an enduring business process relationship between a feature class and another table or feature class



Simple

One-to-one

Relationship

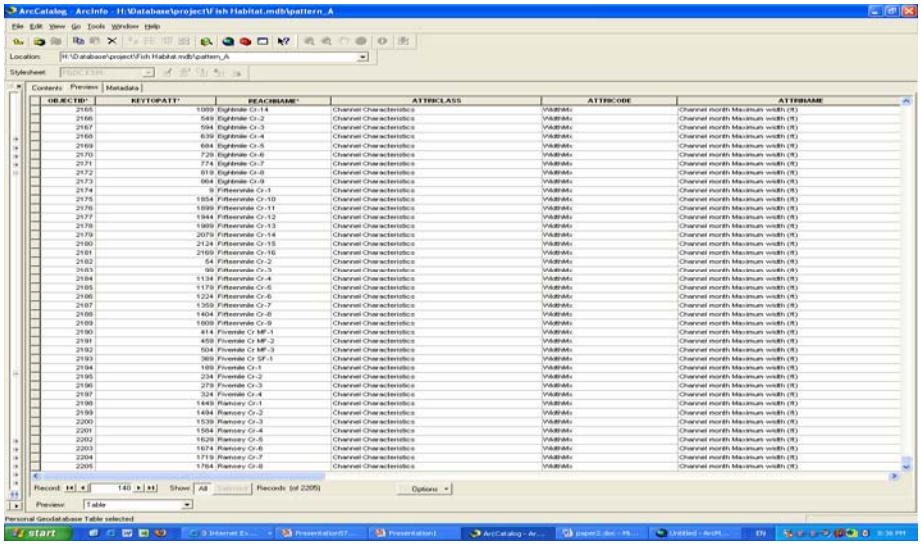
Method

- Simple One-to-One relationship classes created
- Join table to spatial data Based On A Predefined Relationship Class
- Output

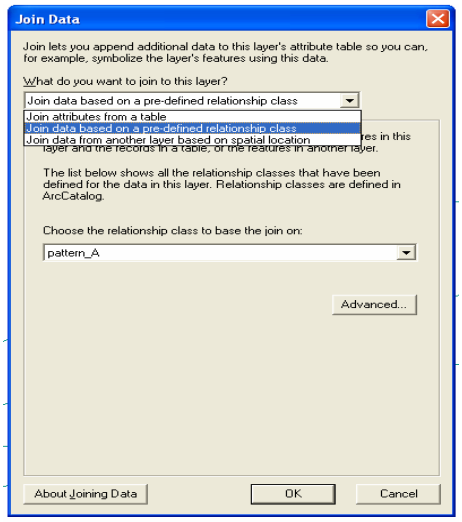
Pattern A

- Original Attribute Table + new key field
- One-to-One Simple relationship class
- Join of Table and Spatial dataset
- Current High Flow Patterns April, May, June

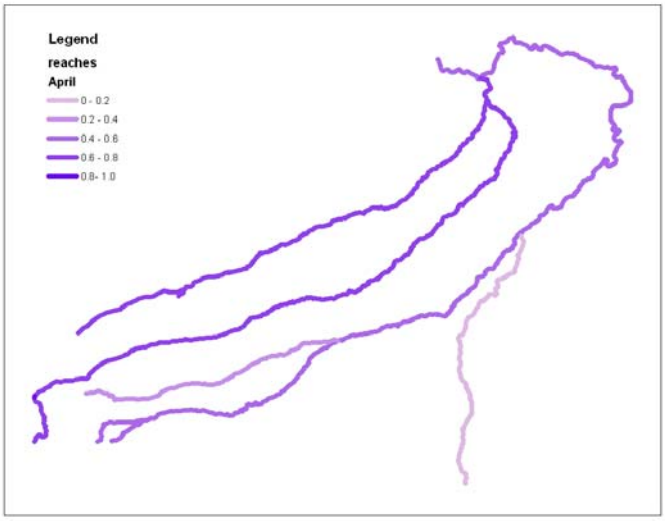
Table



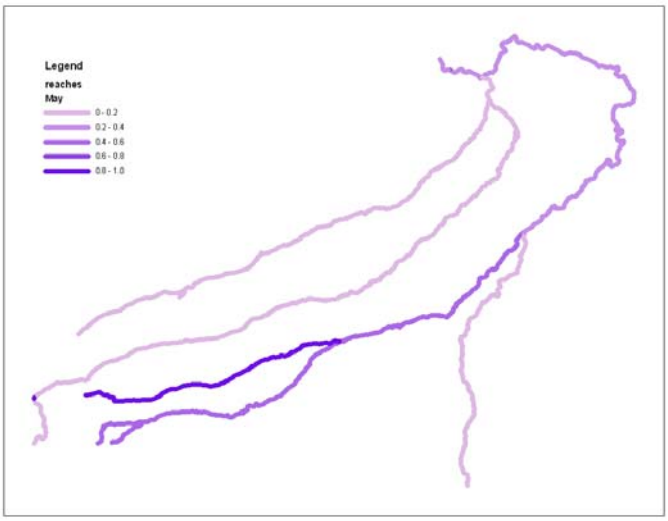
Join



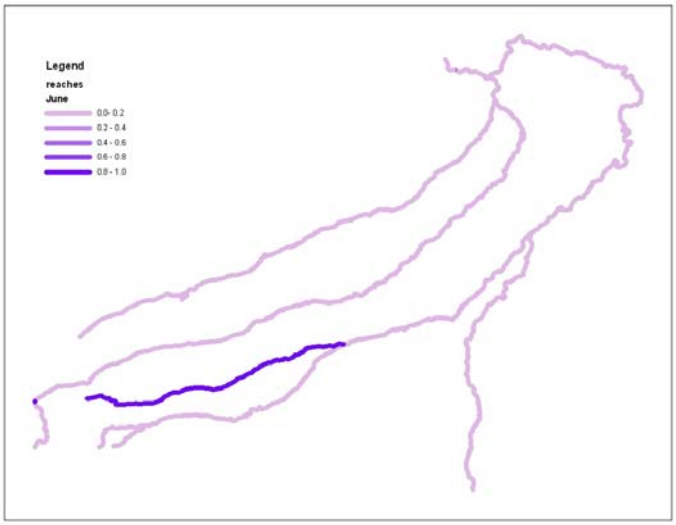
Pattern Flow High Display



Pattern Flow High Display



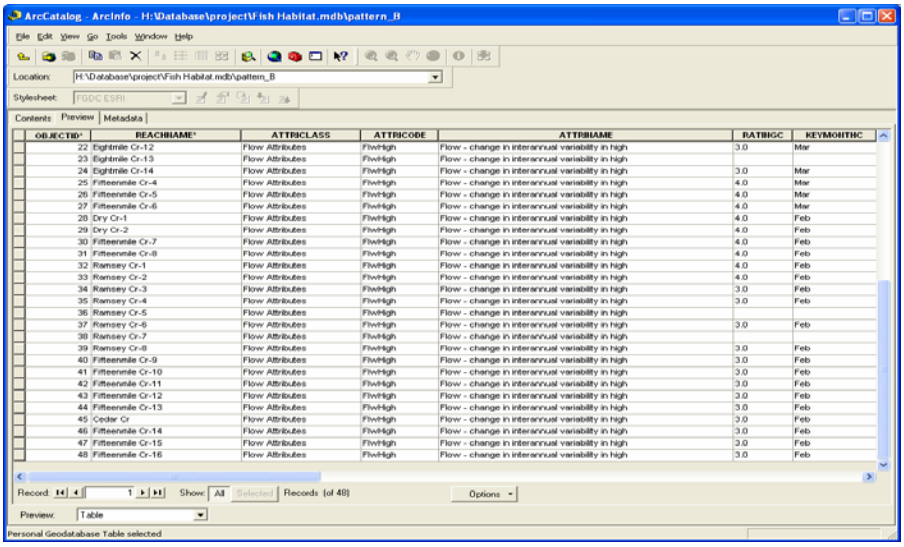
Pattern Flow High Display



Pattern B

- Smaller Table
- Simple One-to-One relationship class
- Join, based on a predefined relationship class
- Shows stream velocity

Table



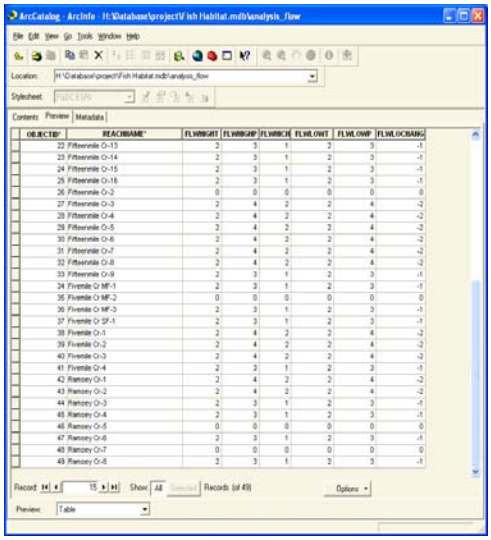
Fifteen Mile Subbasin:
Historic High Flow Rate

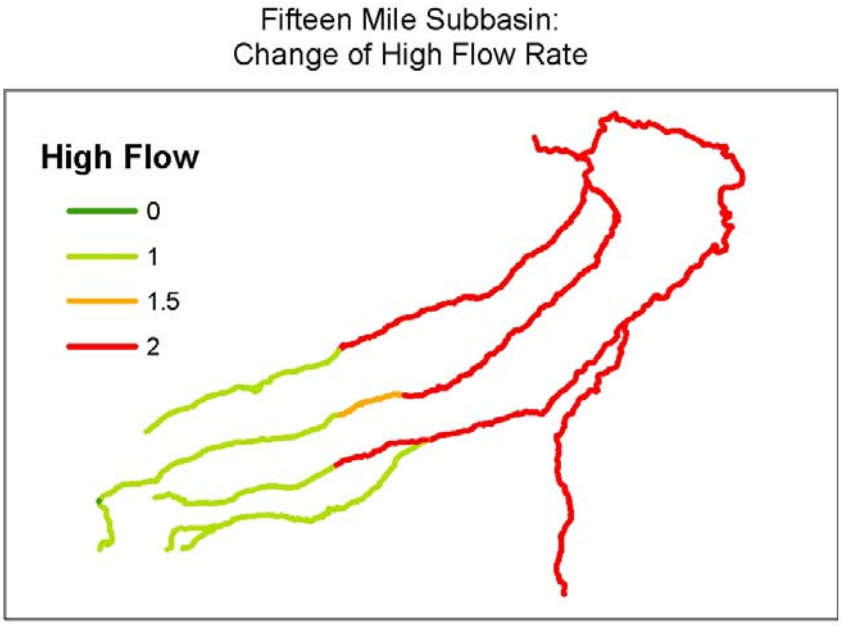
Fifteen Mile Subbasin:
Current High Flow Rate

Analysis Flow

- Even Smaller Table
- Flow change between current and historic rate of flow

Table

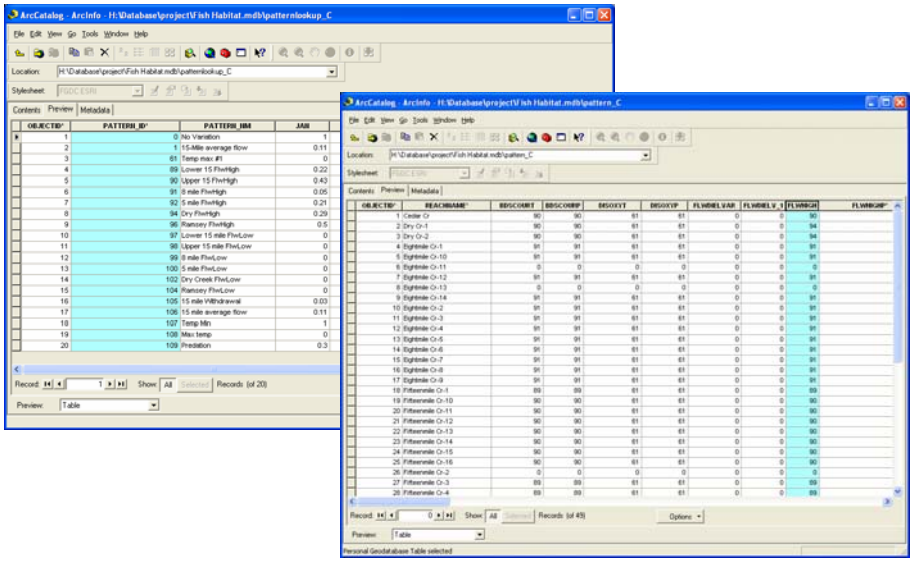




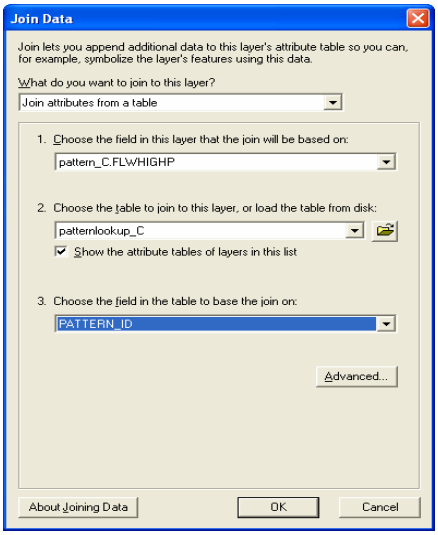
Pattern C

- Pattern ID numbers (from original table) and spatial data create a relationship class
- Pattern ID lookup table
- Join and Join

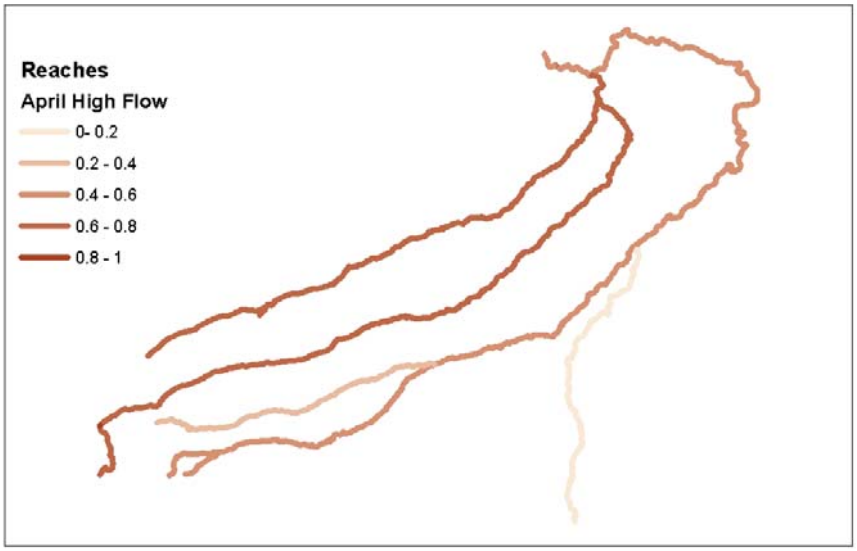
Table



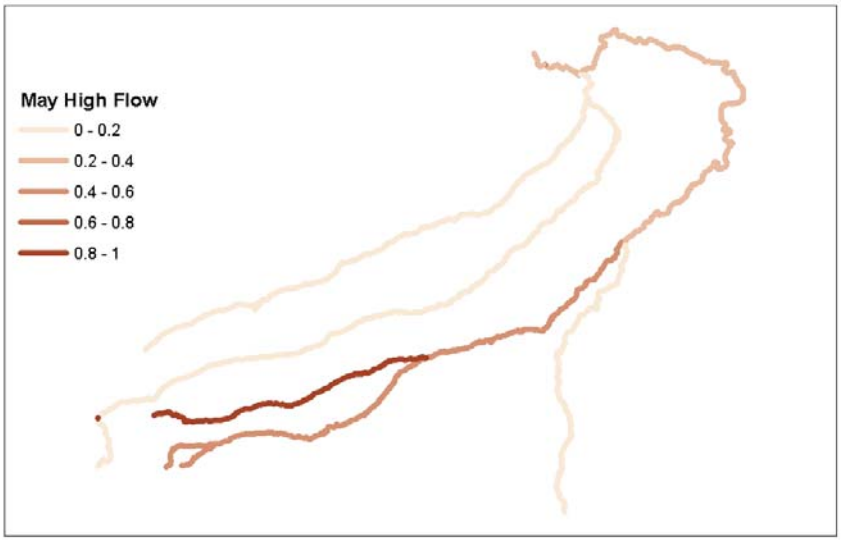
Second Join

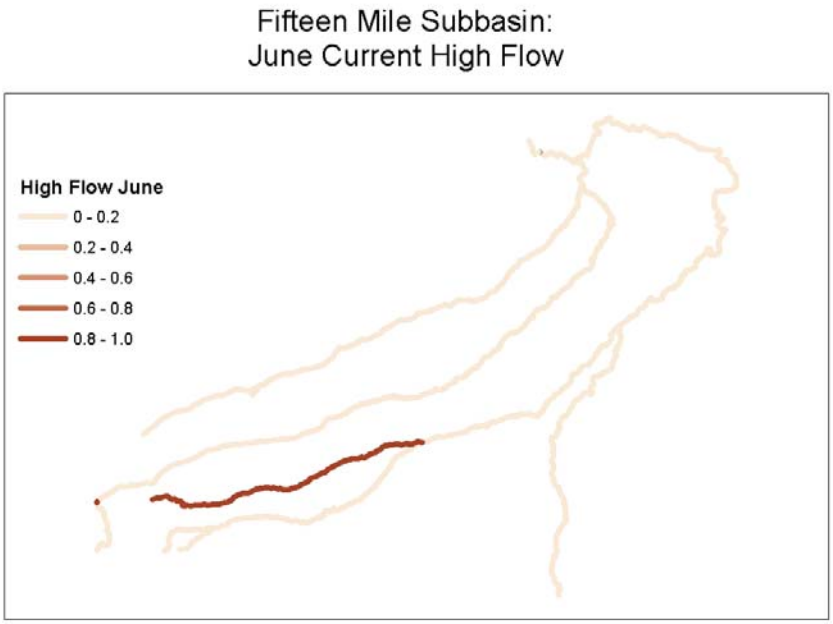


Fifteen Mile Subbasin:
April Current High Flow



Fifteen Mile Subbasin:
May Current High Flow





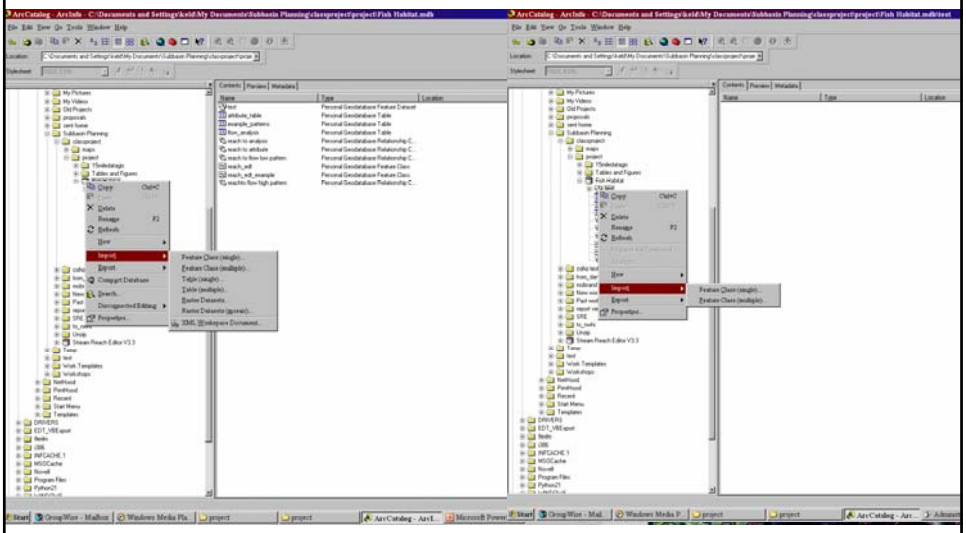
Troubles

Relationship class – use the relationship between a spatial dataset and a dBASE table of attributes to symbolize and map the attributes with a relate.

ESRI confirms that there's no way to define map symbology with fields in a relationship class.

Future ArcMap release. For now we used a join.

Troubles



- A feature dataset will not allow you to import a dBASE table.

Troubles

- Does not import with the shapefile or dBASE table into a geodatabase.
- Can use the import button on the metadata page.

Conclusions

- Not worth the work for pattern data
- Relationship class did not work how we planned.
- If ESRI changed to a relate with a relationship class it may make it feasible.
- Relationship class does help to organize tables and quickly create a join.
- BUT: users must be very familiar with Data