SHORELINE HABITAT
An Automated Approach to Classification and Monitoring

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The First Shoreline Habitat Classification: 2000

Stephanie Mietz

- 8,000 CFS Shoreline
- Geomorphic Classes
- 100-meter minimum mapping resolution
Automated Methodology

GOAL: Provide automated shoreline-habitat data across stage-discharge ranges for the entire Grand Canyon Ecosystem Corridor.

- Classify whole surfaces by selected habitat characteristics such as: geomorphology, texture (roughness), vegetation, and ultimately, velocity and temperature from models.

- Develop automated techniques for extracting habitat data from these surfaces for individual stage lines or depth zones bracketing stage lines.
Shoreline Habitat Polygons (RM22)

An automated procedure for delineating backwaters and other shoreline habitats from imagery and historical shorelines.

- For every 5 meters of downstream distance...
- Select the closest shoreline point (promontory).
Shoreline Habitat Polygons (RM22)

- Connect each point and merge with the shoreline.
- Resulting polygons enclose embayments of various size, physical shoreline characteristics and thermal properties.
- Ratios of shoreline length to closure length are one measurement of complexity (rugosity).

Legend

- **r3swat5-505**
- **SHRWATRATIO**
  - 0.000000 - 0.990000
  - 0.990001 - 1.990000
  - 1.990001 - 2.990000
  - 2.990001 - 3.990000
  - 3.990001 - 12.000000
Shoreline Habitat Polygons (RM22)

- Physical characteristics of shorelines
- Roughness above and below 8,000 CFS.
2000 Low Summer Steady Flow test: shoreline temperatures

Riffle

20.4°C

Broad shallow area

Backwater 18.5-20.7°C

RM 68 Thermal infrared image 7/25/00

RM 64.6L Thermal Infared Imagery 7/25/00
Shoreline Habitat Polygons (RM22)

USU Shorelines from Imagery

April 1996

May, 2002
Dec., 2004

USU Shorelines from Imagery

May, 2005

Shoreline Habitat Polygons (RM22)

FIST Approaches to Measuring Change
Surface Change

Legend
Surface Change 5/04-11/04
Value
- < -100 cm
- -100 to -25 cm
- -25 to 0 cm
- 0 to 25 cm
- 25 to 100 cm
- > 100 cm

Legend
Surface Change 11/04-12/04
Value
- < -100 cm
- -100 to -25 cm
- -25 to 0 cm
- 0 to 25 cm
- 25 to 100 cm
- > 100 cm
Variance From Minimum Surface: 11/04 & 12/04

Legend
- GCMRC Tenth Miles
- Full Eddy
- 8,000 cfs shoreline 11/04
- 8,000 cfs Shoreline 12/04

Minimum Surface Difference 11
Value
- 0 - 25 cm
- 25 - 50 cm
- 50 - 100 cm
- 100 + cm

Minimum Surface Difference 12/04
Value
- 0 - 25 cm
- 25 - 50 cm
- 50 - 100 cm
- 100 + cm
Variance From Minimum Surface

Above Minimum Surface: 11/04
Value
- 0 - 25 cm
- 25 - 50 cm
- 50 - 100 cm
- 100 + cm
- Extended EDZ (XEDZ)
- Eddy Zone (EDZ)

Above Minimum Surface: 12/04
Value
- 0 - 25 cm
- 25 - 50 cm
- 50 - 100 cm
- 100 + cm
- Extended EDZ (XEDZ)
- Eddy Zone (EDZ)