STREAM HABITAT ASSESSMENT: WHY & HOW

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INTRODUCTION / BACKGROUND

- Problem: 305(b) report states that almost 50% of MO's streams only 'partially support aquatic life' due to impacts … is this true?
- Solution: Incorporate a probabilistic sampling design into a statewide biomonitoring program … **RAM**
  - MDC & MDNR - cooperative effort
  - Begins in 2002 & operates on a 5-yr cycle
- Purpose: Assess current status and attempt to detect changes (trends) of:
  - Fish / invertebrates / water quality / physical habitat
  - "How are we going to use data?"
    - Examine relationships of fish & inverts to:
    - Habitat / Landuse / Water Quality
- Population of Interest - all perennial warmwater wadeable streams
- Pilot Study (2000 - 2001)
  - Refine fish sampling protocols
  - Refine physical habitat tools
    - Methods must be acceptable & useable to both agencies

HISTORICAL PERSPECTIVE

- Qualitative phab assessments
  - Quick
  - Incorporated metrics of concern
  - Lack of repeatability
  - High variability
- Bottom line … get out what you put in!

OBJECTIVE

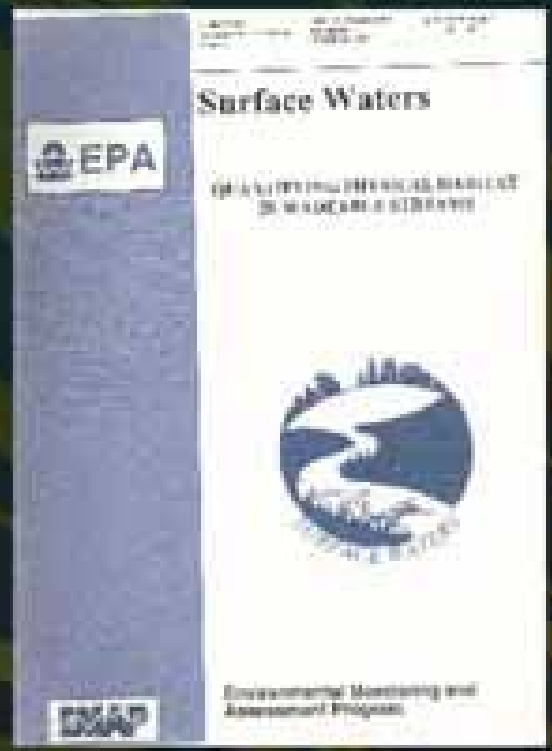
Focus on:

- Protocol we're using in MO
  - Likes / dislikes
  - New techno advances merit a look
- Phab protocol 'Efficient & Proficient' to be accepted
  - Individual metrics must …
  - Provide strong correlations / relationships
    - Describe biotic community
  - Assessment time
    - Important but not limiting factor
  - S/N ratio
    - Low scores indicative of imprecise methods

PHYSICAL HABITAT ASSESSMENT

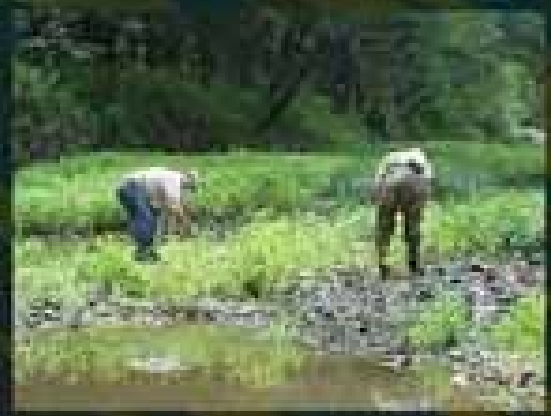
REMAP protocols

- **REMAP** site description
  - Reach is randomly selected
  - 40x mean wetted width
    - 150 m min
    - 300 m max
  - 11 equally spaced channel x-sections
    - Section = 1/10 total reach length



REMAP HABITAT ASSESSMENT

- **R-EMAP procedures**
  - Relatively intensive survey method
    - 3-4 persons
    - 2-4 hrs / reach
  - Strong points:
    - High S/N ratio
    - High precision
  - Limitations:
    - Site specific
    - Some qualitative assessment



- **R-EMAP metrics**
  - Include limitations we see
  - Site specific vs watershed influences on fish (discussion topic)
  - Other tools (GIS landuse, riparian estimator, hydologic component)

REMAP HABITAT ASSESSMENT

Components

- Longitudinal profile
  - Some measured at 10 - 15 equally spaced intervals per section
    - Thalweg depth
    - Presence of fine sediment
    - Channel description
  - Others measured / recorded for each of 10 sections
    - Wetted width
    - Bar width

REMAP HABITAT ASSESSMENT

Components

- **Discharge**
  - Measured at 15-20 equally spaced intervals
- **Large woody debris**
  - Tally large wood debris within and above bankfull channel
  - Recorded between each channel cross section
  - Several size classes
    - Concern: some studies show this metric is important while others do not

REMAP HABITAT ASSESSMENT

Components

- Channel & Riparian X-section
  - Completed at each of 10 sections
  - Measure:
    - Channel x-section dimensions
    - Bank height & angle
    - Gradient
    - Sinuosity
    - Riparian canopy
  - Visually estimate:
    - Substrate size & embeddedness
    - Riparian cover
    - Fish habitat
  - Human disturbances

Potential Modifications / Additions?

Utilize technology

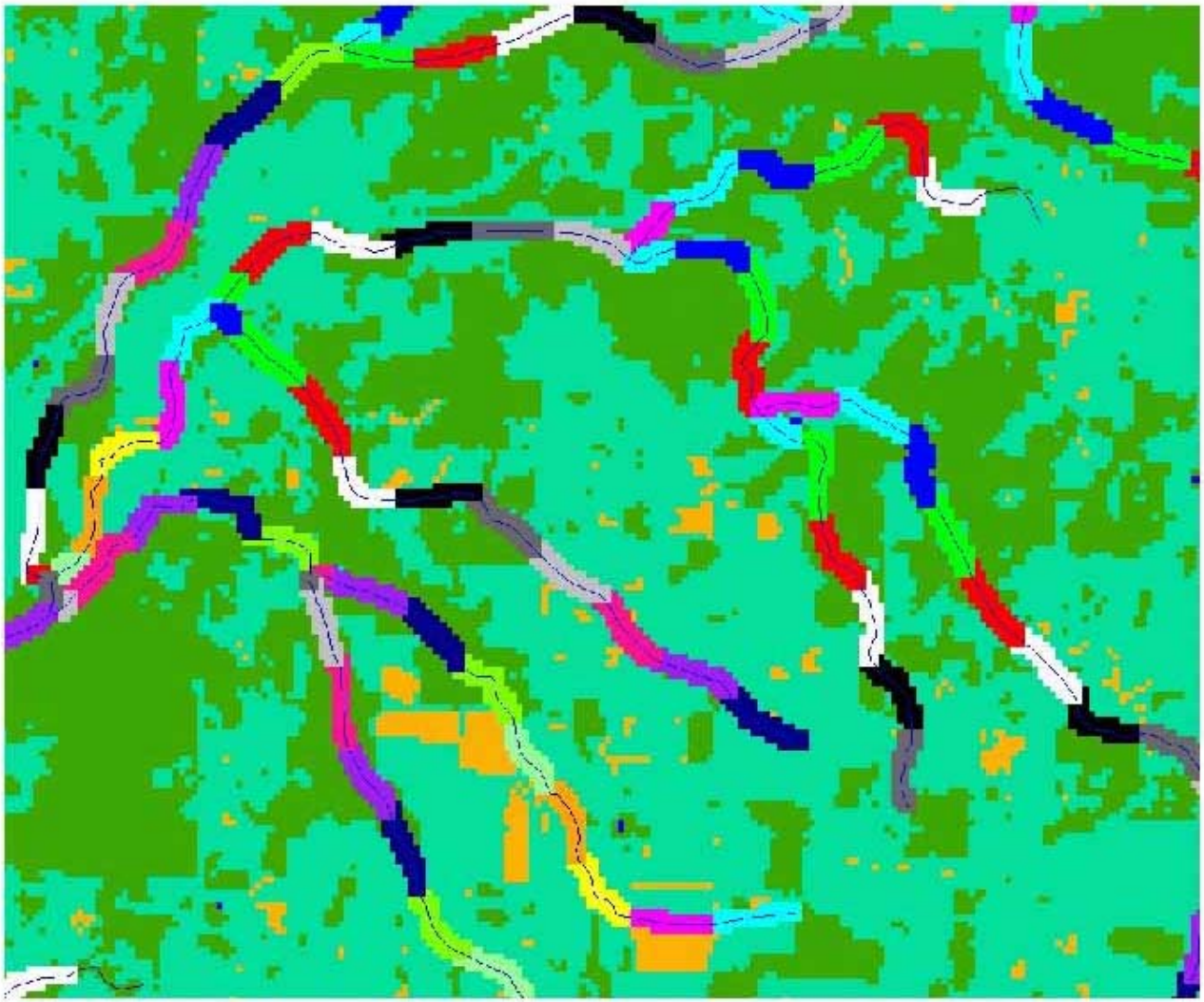
- Site / reach specific vs watershed influences on fish & inverts
  - Channel sinuosity about site
  - Stream gradient above / below site
  - Watershed landuse
  - 'human' influences above site
  - Stream vs site temp
    - Good reach canopy vs poor watershed (vice - versa)
  - Pool frequency
    - MO lacks traditional pool - riffle - run sequence
    - Relative to channel width / watershed size
    - Doc #'s, % total area, freq
  - Hydrology / 'Flashyness' index
    - Dynamic stormevent changes (urban & channelized)
    - Events influence form & function of receiving stream
      - Physical structure
      - Baseflow water level

Riparian Estimator

New MDC Tool

- Developed by Mark Caldwell
  - Caldwm@mail.conservation.state.mo.us
  - 573/882-9880 x-3252
- Provides estimation of land use / land cover along riparian corridor above any specific point
  - Designed for MORAP landcover layer
  - Derived from Landsat 30 m satellite imagery
  - Stream segments are 400 m in length
  - Creates a uniform 90 m wide buffer
  - Creates a vector stream file with landcover class percentages
  - Used on both 1:100,000 and 1:24,000 stream data

Riparian Estimator: Buffer Zones



Streams

Jameshedland
- Forest
- Wetland
- Grassland
- Cropland
- Urban
- Water

Streams are overlaid on buffers,which are overlaid on a land-cover classification. The colors of the buffer zones simply show the individual segments.

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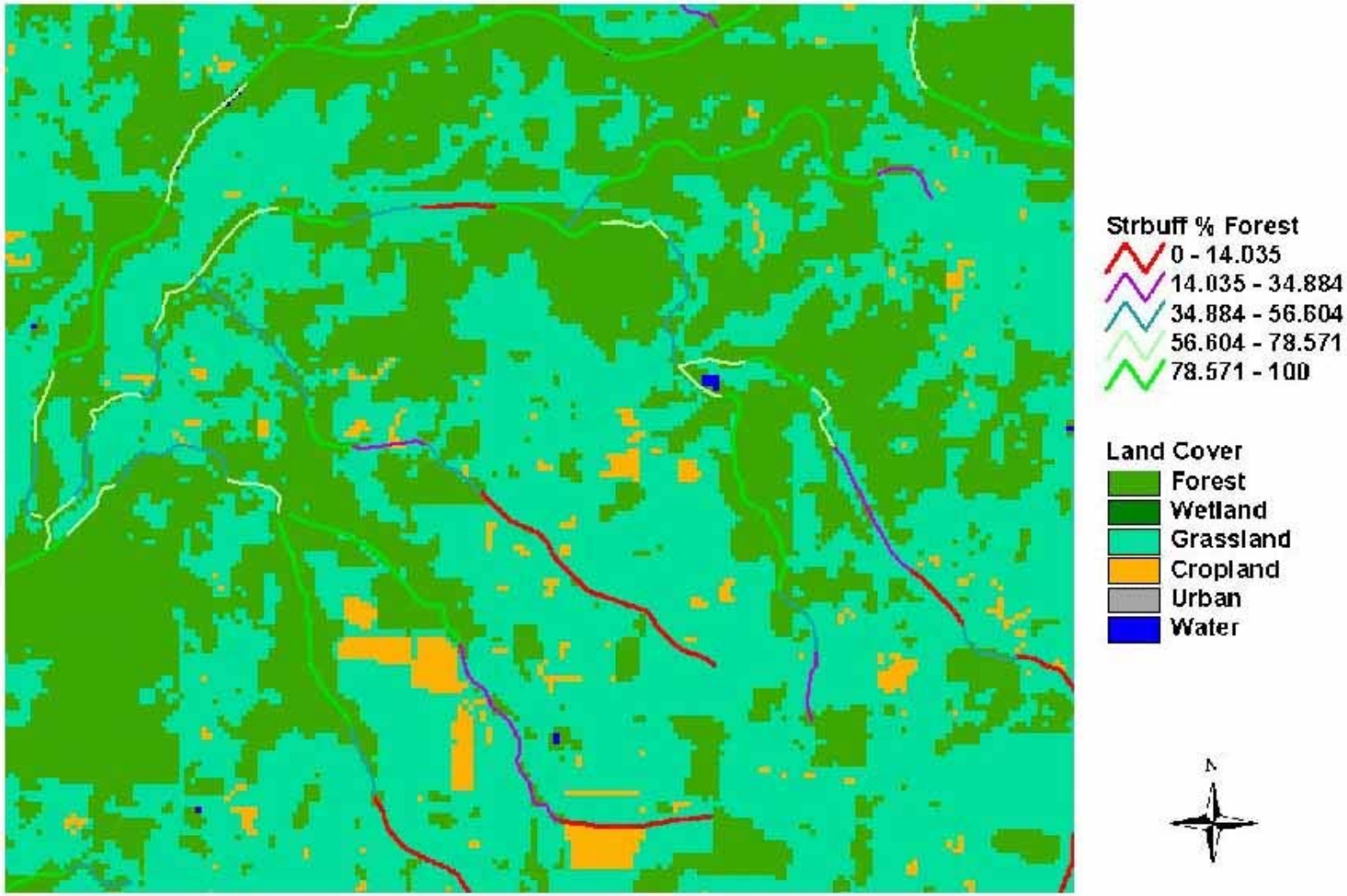
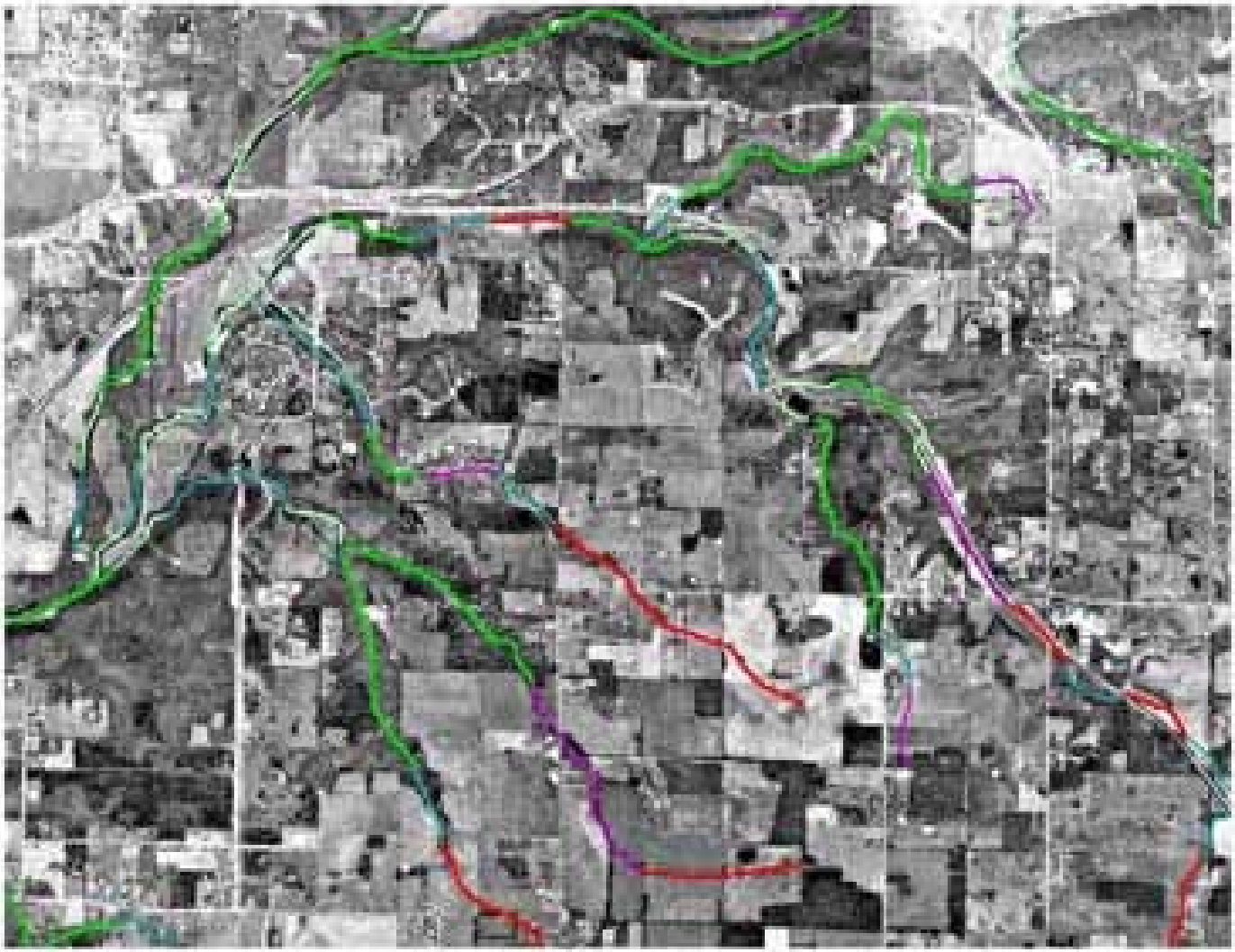
Riparian Estimator: Forest



Riparian Estimator: % Forest with DOQQ's



QUESTIONS