Recovery Potential Metrics Summary Form

Indicator Name: LOCAL SOCIO-ECONOMIC CONDITIONS

Type: Social Context

Rationale/Relevance to Recovery Potential: A community's socio-economic well-being or lack thereof can have mixed effects on community views about the prospects for restoration. A distressed rural area may be inclined to see restoration negatively if additional restrictions, expenses or loss of economic options are assumed. In contrast, restorations that may increase property value, provide restoration project jobs and an improved recreational economy may be welcomed. Generally, whereas perceptions in distressed areas provide an obstacle, the ultimate effects of a restoration often provide a welcome improvement. This metric can be used as a negative input to the overall social context score if it is based on perceptions of distressed communities, or as a positive input to the score if based on the potential economic benefits to distressed areas – thus a scoring choice is necessary before each screening use.

How Measured: This metric is drawn directly from measures developed by the Sonoran Institute in 2005. Nine measures were originally published. These included high-distress interpretations of: 1. long-term employment change; 2. unemployment rate; 3. per capita income; 4. families living under poverty; 5. educational attainment, 6. housing affordability, 7. short-term employment change, 8. population change, and 9. natural disaster risk. The measures can be aggregated into a single value, used singly, or in other combinations. The aggregated index value is reported on county level, which then needs to be transposed to a watershed or stream corridor value by proportional averaging in order to relate it to impaired waters recovery potential screening.

Data Sources: The primary data sources for the nine component metrics used by the Sonoran Institute study are all nationally available GIS datasets, available from the US Dept of Commerce Bureau of Economic Analysis (long and short term employment change, per capita income, housing affordability, See: http://www.bea.gov/), Bureau of Labor Statistics (unemployment rate, natural disaster risk, See: http://www.bls.gov/data/), and Census Bureau (population change, families living under poverty, educational attainment, See: http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml). Generally these are county-aggregated datasets although finer, census-tract data are available for the Census Bureau elements. NOAA has developed spatial trends in socioeconomics for coastal areas (See: http://www.csc.noaa.gov/digitalcoast/data/stics/index.html). ArcGIS online offers a number of compiled map services on socio-economic data that can be opened directly in ArcMap (http://www.arcgis.com/home/gallery.html).

Indicator Status (check one or more)

___x__ Developmental concept.
___x__ Plausible relationship to recovery.
______ Single documentation in literature or practice.
___x__ Multiple documentation in literature or practice.
______ Quantification.

Comments: The several component measures may be used in combination as a summary index, singled out, or recombined as desired.

Supporting Literature (abbrev. citations and points made):

- (Sonoran Institute 2005) The original Sonoran system used nine primary indicators developed from county-level Census Bureau, Bureau of Labor Statistics, or Bureau of

Economic Analysis information, which were then averaged to yield an overall county-level stress indicator. The data used for the Sonoran Institute primary indicators are summarized below:

1. Long-term employment change, 1970 to 2002 - Total long-term employment change data comes from the U.S Department of Commerce, Bureau of Economic Analysis, Regional Economic Information System, Washington, DC, 2004. (On a relative scale of 0-100, negative changes in employment or smaller positive changes in employment would be assigned higher stress scores)

2. Unemployment rate, 2003 - Average annual unemployment rate data comes from the U.S. Department of Labor, Bureau of Labor Statistics, Washington, DC, 2004. (On a relative scale of 0-100, smaller levels of employment rate would be assigned higher stress scores)

3. Per capita income, 2002 - Per capita income (PCI) data comes from the U.S Department of Commerce, Bureau of Economic Analysis, Regional Economic Information System, Washington, DC, 2004. (On a relative scale of 0-100, smaller levels of per capita income would be assigned higher stress scores)

4. Families living under poverty, 2000 - Poverty (family) data comes from the U.S. Department of Commerce, Census Bureau, 2000 Decennial Census, Washington, DC. (On a relative scale of 0-100, higher levels of families living under poverty would be assigned higher stress scores)

5. Educational attainment, 2000 - Educational attainment data (for adults 25 years or older) comes from the U.S. Department of Commerce, Census Bureau, 2000 Decennial Census, Washington, DC. (On a relative scale of 0-100, lower levels of educational attainment would be assigned higher stress scores)

6. Housing affordability, 2000 - Housing Affordability data comes from the U.S. Department of Commerce, Census Bureau, 2000 Decennial Census, Washington, DC. Determined by calculating a ratio between median family income and median house price. Higher scores for this ratio indicate a higher relative ability for families to afford to buy a residential unit (house) in a given county. (On a relative scale of 0-100, lower housing affordabilty ratios would be assigned higher stress scores)

Additional background information is provided in a downloadable PDF file available at the following Internet address: <http://www.sonoran.org/programs/si_se_res_inland_nw.html>.

- (Research Triangle Institute, project notes, 2005 – unpublished) RTI calculated 2 versions of the Socio-Economic Stress indicator. The zip file "stress_dec2005" includes the calculations for 5 of the 6 "primary" Sonoran measures. There are some concerns with the 6th measure for Illinois. While the urban area effects will also show up in our higher-resolution housing indicator – the Sonoran logic was developed for non-metropolitan counties – and affordable housing (SCORE6) is such a different animal around Chicago as opposed to rural Illinois that SCORE6 did not seem worth including. The "overall" Sonoran indicator in the zipped shapefile coverage, therefore, did not include this measure. For comparison, RTI provided a second .dbf file which includes the 6th measure and recalculated the overall measure, as discussed below.

Additional Sonoran Measure:

SON1_6 has the full complement of the 6 primary Sonoran "score' indicators plus the overall indicator (average of the six primary indicators). SCORE6 is based on taking the ratio of median household incomde divided by the median value of the occupied housing units. This percentage forms a housing affordability factors – and the higher this value – the easier it would be for a family to buy a house. Since the Sonoran system wants to have high values go with higher levels of stress and get a number up around 100 for the most stressful configuration – then you have to sort this ratio in ascending order and then take those rank orders to calculate the SCORE6 results for each county (cheapest housing county gets a very low score and the most expensive housing in places like Chicago gets a very high score up around 100).

Concerns: The Score6 affordable housing indicator is very skewed (urban county housing just inherently seems more pricey that housing in rural areas) – and especially when applying whole-county morsels of data to do the 303(d) segment weightings – I don't see Score6 is all that helpful. And if you pull out Score6 -- then I think you wind up with similar reservations about the overall indicator too. Even for the other housing indicator we did where we used Census geometries down to the block/block group level – you still find a big difference in the behavior of urbanized versus rural areas – but at least with the finer scale Census geometries you are not so worried that the results are even further distorted by using units as large as counties

The main missing ingredient was a table to show the weights for each 303(d) water depending on how may counties it falls into. The CNTRATIO file has the counties associated with each 303(d) listing ID – and the weight (decimal percent) of the size of the 303(d) entity within each of these country records. If the 303(d) water falls entirely within a single county – then the weight is 1 even. You could use this file to develop indicators for any type of country data. With this weightings table – you can process any county-based socio-economic data you were interested in.

- (Walsh et al., 2005) Changes in public attitudes and amenity of the neighborhood and its waterways are likely to result in tangible economic benefits, such as increased real estate values, which in turn, if coupled with educational programs designed to increase public awareness about the social and ecological advantages, are likely to increase and reinforce acceptance of LID by management authorities (Fig. 3).
  Thus, the challenge for stream ecologists in furthering our understanding of streams in urban areas is to not only better understand interactions between catchments and stream processes, but to integrate this work with social, economic, and political drivers of the urban environment (719).
- (Grau et al., 2003) Consequently, most research on the ecological implications of LUCC in the tropics focuses on the dominant pattern of deforestation and fragmentation (e.g., Houghton 1999, Laurence et al. 2002) which is driven by the prevailing socioeconomic and demographic factors (1159).
- (Filipe et al., 2004) Once reserve areas have been selected, they must be integrated within a basin management approach to harmonize development opportunities and exploitation of aquatic resources (Meffe 2002). There is also a need for ecologists, conservationists, social scientists, and stakeholders to negotiate use rights (Cullen et al. 1999). In multinational water bodies, such as the Guadiana River basin, international collaboration is needed and all social, economic, and political constraints should be considered. Additionally, the establishment of discrete reserves is not enough to protect freshwater fishes (Angermeier 2000; Meffe 2002). Interventions upstream or downstream must be considered in the management of reserves because these activities could have implications for the species for which the reserve is designed (Cowx & Collares-Pereira 2002). In particular, the construction of a dam outside of the reserve network has implications for the recolonization of each reserve area because it may disrupt migration pathways. Similarly, the introduction of alien species elsewhere in the watershed may have long-term implications if the introduced species is able to disperse into the reserves. In our case study, the Alqueva and Pedrogao reservoirs will create unsuitable habitats for native fishes by affecting their movement and enhancing the populations of exotic species. In addition, the lack of facilities for fish passage around

Alqueva has permanently isolated the populations upstream and downstream of the dam (197).

- (Milon and Scrogin 2006) The incorporation of socioeconomic and latent psychological factors in wetland valuation studies also promises to enhance understanding of why some individuals value ecosystem services while others do not.
- (Reichert et al. 2007) The perceived severity of a degradation problem depends on the desired state to be achieved. The definition of this state links the natural scientific part of the problem to the socioeconomic part, as it is a political issue to decide in which environment a certain community would like to live. A handle to the socio-economic part of the problem is obtained by performing a stakeholder analysis with the goal of eliciting their preferences and supporting consensus-building for a rehabilitation project (Grimble and Wellard, 1997; World Bank, 1996).