Measuring and Predicting Leakage from Present and Future Conservation Projects

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Sponsored By
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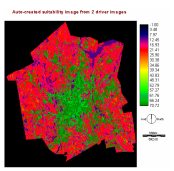
HERO

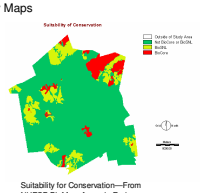
Abstract

This poster introduces and discusses a methodology which computes the change in utility for conservation and development interests, with respect to the effect of a conservation project. The methodology analyzes the displacement of development projects, caused by conservation plans, with two modes of analysis: measurement of implemented conservation activity and prediction of future conservation effects. By measuring displacement through the concepts of leakage and dodge, interested parties can consider various consistent scenarios for current or future conservation plans. The methodology requires the user to determine suitability for development and conservation, as well as four maps of disturbed and undisturbed land at two different points in time. A beginning land use map of the initial time (Time 1), The other time (time 2) has three land use maps: 1) a map of development without legal restrictions, i.e. Business as Usual, 2) a map of a conservation project restricting future development, i.e. Project, and 3) a map of the true ending time. The method analyses these maps to calculate the effectiveness of a conservation project.

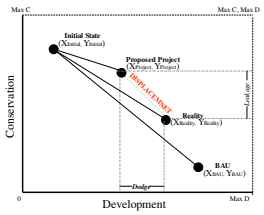
Suitability Maps



Suitability for Development using 2 Driver Images—Slope and Land Use History 1971



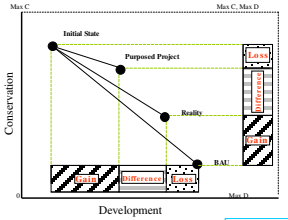
Suitability for Conservation—From NHESP BioMap. Areas in Red are most suitable, yellow second most suitable, and green least suitable



Theoretical ordering of points in terms of utility for conservation and development

$X_{Reality} - X_{Project} = Dodge$

$Y_{Project} - Y_{Reality} = Leakage$



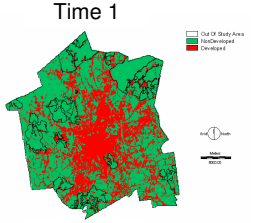
Gain, Difference, and Loss for both utility of conservation and development.

$X_{Reality} - X_{Project} = Dodge$

$Y_{Project} - Y_{Reality} = Leakage$

Measurement

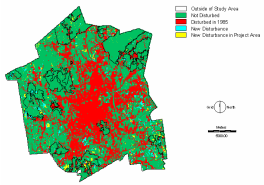
Time 1



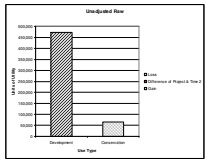
Time 1 (Measurement)—Actual image of land use in 1985 in two categories, Nondeveloped versus Developed. A vector image of the conservation plan is overlaid on top of it

Leakdetect Output (Measurement). The BAU was overly pessimistic, prediction less development than actually occurred.

BAU

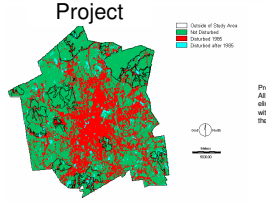


BAU (Measurement). Created in GEOMOD using only suitability for development as criteria.

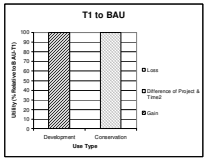


RAW Data from Unadjusted BAU (Measurement) Development has ten times the amount of gain as conservation

Project

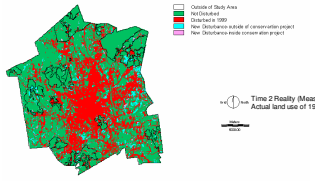


Project (Measurement). All development is eliminated from the areas within the vector image of the conservation plan



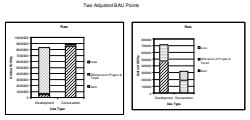
Utility (% Relative to Time 1 to BAU)—Measurement. All gain for development, all loss for conservation.

Time 2 Reality



Time 2 Reality (Measurement). Actual land use of 1999.

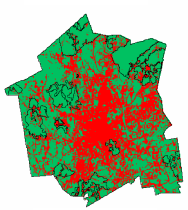
Leakdetect Output (Measurement). The clusters in the lower right hand corner are adjusted BAU's where conservation losses completely and development wins entirely.



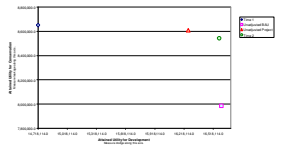
Two Adjusted BAU Points (Measurement). Adjustment A shows a scenario where Development has no gain, while Adjustment B shows development with significant gain

Prediction

Time 1

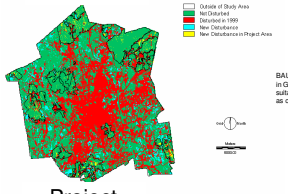


Time 1 (Prediction)—Actual image of land use in 1999 in two categories, Nondeveloped versus Developed. A vector image of the conservation plan is overlaid on top of it

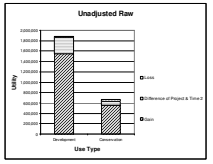


Leakdetect Output (Prediction) Follows the theoretical ordering in Figure 1

BAU

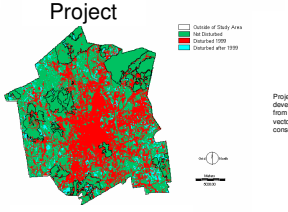


BAU (Prediction) Created in GEOMOD using only suitability for development as criteria.

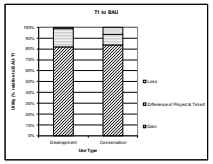


RAW Data from Unadjusted BAU (Prediction) Development has three times the amount of gain as conservation.

Project

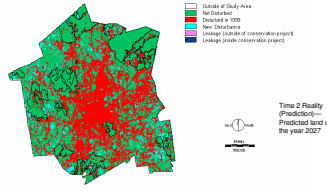


Project (Prediction) All development is eliminated from the areas within the vector image of the conservation plan

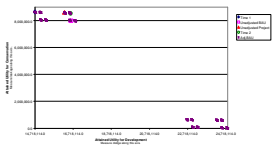


Utility (% Relative from Time 1 to BAU)—Prediction. Conservation has more gain than development, as well as more loss.

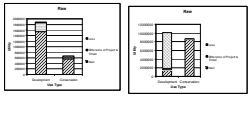
Time 2 Reality



Time 2 Reality (Prediction)—Predicted land use for the year 2027



Leakdetect Output (Prediction). The adjustments in the lower right hand corner are possible BAU scenarios.



Two Adjusted BAU Points (Prediction). Adjustment A shows development with a lot of gain, while Adjustment B shows development with very little

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