SCENARIO EVALUATIONS

INTRODUCTION TO SCENARIO EVALUATIONS

To judge the conservation compatibility of areas within a planning region, biodiversity value must be integrated with socioeconomic factors, such as current land use, current conservation status, and ownership. One of the most powerful features of Vista is its ability to compare various scenarios representing land use and conservation in the planning region - in other words, alternate plans that identify which places to conserve, areas where there are gaps in protection, and which places to designate for housing, roads, or other development. Land use/management and policy data for the planning region obtained from a variety of sources are defined as scenarios translated into "standard" land use and policy types, which can then be compared against distributions of elements and evaluated in terms of conservation goals. Using Vista, a customized plan can be developed for the planning region that will enable it to conserve what it values most, balancing diverse land uses and priorities, such as natural habitats, farmland, and historic preservation.

Three distinct processes comprise Scenario Evaluation analyses: 1) creating translators, 2) defining scenarios, and 3) evaluating scenarios. The first two components (translators and scenarios) basically prepare data so that it can be effectively evaluated against element distributions and goals.

Translators

Translators are created by utilizing a wizard to crosswalk land use/management practices represented in the input layers to land use intent categories used by Vista in order to assess element compatibility with land use in the planning region. First, attributes of the input layer that are relevant to land use/management practices are identified, and Vista assembles a list of unique permutations of types for these attributes. Then the land use intent category that corresponds to these types is selected. Translators are saved in the Vista database so that new versions of land use/management layers (e.g., an updated stream setback layer) can be directly incorporated into a scenario. The same process is used to translate policy practices into Vista policy types. These types are used to assess the degree to which policy mechanisms allow or prevent land uses of greater intensity, i.e., the amount of protection afforded the element.

Scenarios

Scenarios are composed of individual layers obtained from multiple agencies (e.g., U.S. Forest Service) representing different policies (e.g., zoning). Using translators, attributes of the layers are converted to Vista types according to both the land use permitted (e.g., biodiversity reserve, recreational open space, low-intensity agriculture) and the type of policy providing protection (e.g., voluntary, easement, legislated). Layers are then sequenced according to precedence, with the layer representing the most dominant uses/policies positioned at the top (e.g., zoning is usually the last policy to define allowable land uses, so it typically appears at the bottom of the list). Using the input layers, their translators, and order of precedence, Vista creates two maps to describe the planning scenario: a

land use/management raster and a protection policy raster, to be used in evaluations.
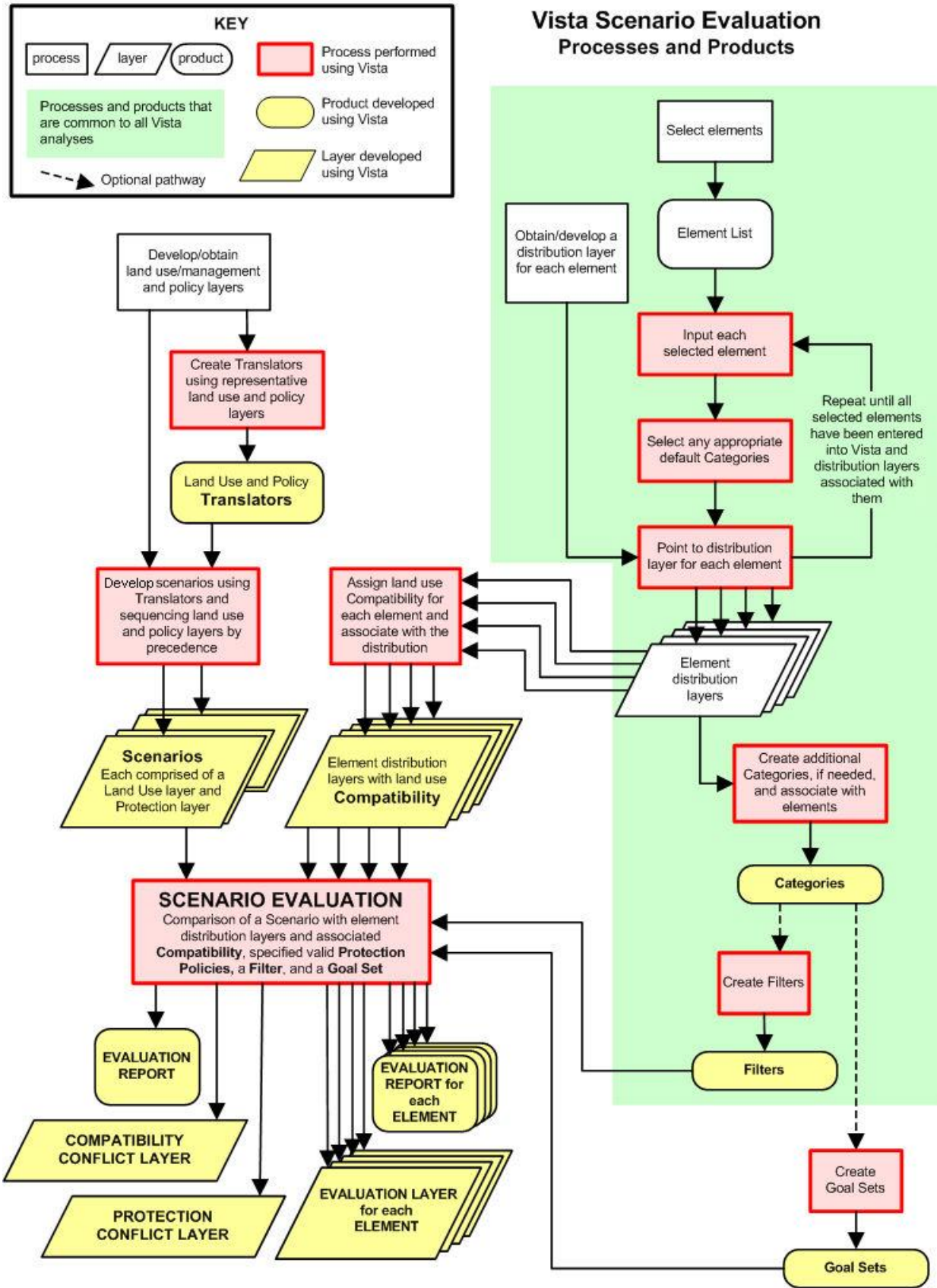
Scenario Evaluations

Vista can evaluate the performance of an input scenario, whether it describes current conditions or potential future conditions, with respect to a specific set of elements and conservation goals. Through this analysis, areas can be identified where land use is incompatible with conservation goals, and where potential land use conflicts may be on the horizon.

The process for evaluating a scenario begins with selection of the scenario, a filter (defining the set of elements to be conserved), and a goal set. If protection is to be evaluated, protection policies considered to offer valid protection to elements must be specified. This decision, like the element filter and goals, may be changed and the evaluation process can be repeated as often as needed to test alternate land use scenarios, or re-run scenarios when new data become available.

The products of a Scenario Evaluation are a report and several visualization layers that can be used in the decision-making process. The report summarizes, in total and by category, the performance of the scenario in terms of the number and percentage of elements that met conservation goals. The report also provides a detailed comparison of individual elements against the scenario: their original distribution, and the amount/percentage that was retained in areas with compatible land use, both with and without adequate protection. The raster layers generated by the Scenario Evaluation identify areas in the planning region where opportunities to improve performance against goals exist. The first layer identifies compatibility conflicts - locations where elements with unmet goals due to incompatibility of land use are concentrated. The second summary layer shows protection policy conflicts - areas where elements are compatible with land use, but insufficiently protected to meet the goals. In addition, a set of separate maps is generated, one per element, which distinguishes between areas of incompatibility, compatibility without protection, and compatibility with protection for that element.

Once a Scenario Evaluation has been generated, land statuses and their impact on element viability in selected land units (e.g., parcels) within the planning region can be examined using the Site Explorer tool. Provided that the data support such resolution, a Scenario Evaluation exploration can provide detailed information on the land uses and/or policies on a specified site along with element attribute data, including the number of viable occurrences that are protected (i.e., by compatible land uses with reliable policy types), and the percentage of conservation goals that have been achieved for the elements on the site.

KEY

process | layer | product

- Process performed using Vista
- Processes and products that are common to all Vista analyses
- Product developed using Vista
- Layer developed using Vista
- Optional pathway

Vista Scenario Evaluation
Processes and Products

Select elements

Element List

Obtain/develop a distribution layer for each element

Input each selected element

Select any appropriate default Categories

Repeat until all selected elements have been entered into Vista and distribution layers associated with them

Point to distribution layer for each element

Element distribution layers

Create additional Categories, if needed, and associate with elements

Categories

Create Filters

Filters

Create Goal Sets

Goal Sets

Develop/obtain land use/management and policy layers

Create Translators using representative land use and policy layers

Land Use and Policy **Translators**

Develop scenarios using Translators and sequencing land use and policy layers by precedence

Assign land use Compatibility for each element and associate with the distribution

Scenarios
Each comprised of a Land Use layer and Protection layer

Element distribution layers with land use **Compatibility**

SCENARIO EVALUATION
Comparison of a Scenario with element distribution layers and associated **Compatibility**, specified valid **Protection Policies**, a **Filter**, and a **Goal Set**

EVALUATION REPORT

EVALUATION REPORT for each ELEMENT

COMPATIBILITY CONFLICT LAYER

PROTECTION CONFLICT LAYER

EVALUATION LAYER for each ELEMENT

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TRANSLATORS

Objectives

The purpose of this function is to automate cross-walking land use/management practices and their supporting policies to a standard list of land-use intent (LUI) types and policy types (PTs) used by Vista. This is done by creating and saving custom translators for individual layers (e.g., a land use zoning map) to be used to automatically translate layers when defined as scenarios in Vista. A translator can be used to translate any specified layers during the scenario definition process - the layer used to build the translator, updated versions of that layer, and any number of totally different layers - and once created, can be edited as needed. Translators are currently used only for defining scenarios, which are utilized in Scenario Evaluations. (See Appendix F for details on LUI categories, and Appendix G for descriptions of PT.)

Products

This process results in a translator, which can then be used to define scenarios.

Inputs

Inputs to the translator creation process consist of geographic information systems (GIS) layers and accompanying information (e.g., digital, hardcopy, personal communications) that can aid in the process of creating a translator. Many different layers (best obtained directly from the institution that implements the land use or management) may be used, including those representing converted lands, as well as layers attributed with present (and potential) land uses/management categories and policy types within the planning region. Because the goal in building translators is to assign a Vista type to each land use and/or policy type that occurs within the planning region, input layers should be selected that will best represent the full set of types with a minimum of redundancy in order to most efficiently create translators.

In addition to layers, the translator process requires sufficient knowledge about land use/management and policy to be able to appropriately assign Vista "standard" types for LUI and/or PT to layer attributes. This knowledge can come from different sources, including descriptive information found in the GIS layers, associated planning documents, and ”expert knowledge" about the layers. Expert knowledge is particularly useful for determining the appropriate translator to use for PT (i.e., the actual

mechanism used to ensure the land use/management policies are carried out as stated).

Methods Summary

Translators facilitate cross-walking categories of land use/management and policy types found in the planning region to the LUI categories and PT used by Vista. In addition, Vista stores translators so that new, updated versions of land use/policy layers in the region can be incorporated easily into a scenario, and translators can be edited as opinions on the appropriate LUI and PT to represent various land use/management and policy types change. Further, translators can be exported for use in another Vista project, or imported to the current project from another.

Virtually all zoning plans permit more than one land use for a tract. Thus, when cross-walking land use/management and/or policy types in the planning region to "standard" Vista LUI categories and/or PT, a number of Vista types may apply to a single land use or policy type. For example, residential land use lacking unit density and lot size information may be associated with several different LUI. Another example is an easement that cannot be more specifically described, which may relate to multiple PT. Despite the difficulty in some cases of matching each land use/management and/or policy type in the planning region to a single Vista type, the system enforces this restriction. As a result, building more than one translator for a given layer and then using them to translate layers during the scenario definition process will, through evaluation of these scenarios, illustrate the range of different impacts to elements that are possible in the planning region.

Examples:

LUI: A translator is created for a layer by cross-walking each land use/management type in the planning region to the most intensive appropriate LUI. The translator is then used to define one or more scenarios. The scenario(s) is/are utilized in the Scenario Evaluation process, yielding information on potential minimum and maximum (i.e., "worst-case") impacts to elements in the planning region. A second translator for the layer is created by cross-walking types to the most likely LUI during the planning time frame, typically derived from urban growth models, economic forecasts, or expert opinion. Scenario(s) are then defined using this translator. Evaluating the scenario(s) indicate(s) the LUI that are most likely to occur and, thus, affect elements in the region.

PT: A translator is created by associating each policy practice in the planning region with the least stringent appropriate type of PT in terms of offering protection through reliably enforcing the designated land use or preventing a use of greater intensity. Scenario(s) are defined using the translator, and are then used in Scenario Evaluations.

Results of the evaluation(s) reveal which PTs reliably provide protection/ensure management practices that permit element conservation goals to be met. Creating a second translator for the layer that cross-walks types to more stringent PTs might, instead, through scenario definition and evaluation(s), produce results that provide a false sense of security about the protection of elements on those lands.

When assigning LUI and PT to land use/management and policies, respectively, there are no restrictions on the number of Vista types that can utilize a particular translator. This means that the number of LUI or PT that need to be used in creating a translator can be delimited for each project to ensure that, through scenario definition and evaluation, the important conservation impacts of land use/management and/or policy types will be captured in the results.

Note that even if policy can only be influenced on land owned by the planner/planning agency, it is important to characterize the LUI and/or PT for all the land in the planning region to get a reasonably accurate assessment of conservation goals met through analyses. In cases where time and resources limit the Vista LUI and/or PT assigned to only those lands owned or controlled by the planner/planning agency, analyses performed with layers using such translators will need to be limited to only those lands, with elements and conservation goals adjusted accordingly.

Background

The majority of institutions and agencies within planning regions use their own custom designations for land use/management and policy types. For practical application of the Vista software, these different designations must be standardized to a single set of Land Use Intent (LUI) categories and a single set of Policy Types (PT) that are utilized by Vista (described in Appendix F and Appendix G, respectively). The intent of translating custom types to standard descriptions of LUI and PT is to reduce the complexity of evaluating element compatibility and the protection afforded by the policy type (i.e., Scenario Evaluations) against the hundreds of potential land use/management and policy types within a planning region. This is typically accomplished by aggregating the types into fewer categories that are most relevant for this type of assessment. An example of this would be the aggregation of the many urbanized/industrial/commercial uses that most planning jurisdictions allow into several categories since they all have similar impacts on elements of biodiversity.

Limitations

Vista translators serve to convert the many land use/management and policy types used in different jurisdictions to a circumscribed set of "standard" LUI categories and PT that can be utilized effectively in analyses. While the default LUI and PT descriptions attempt to capture the range of conditions on a land unit that may affect ecological compatibility, they are very limited in their ability to address more complex conditions that typically occur (e.g., the multiple effects of land use, management practices, disturbances, and invasions of exotic species). Thus, the default LUI and PT are offered as a useful generic categorization, but they may not be entirely suited to any particular planning region or project. Vista provides the flexibility to permit users (working with NatureServe Vista support staff) to substitute custom LUI and PT lists comprised of types that better capture the important conservation impacts of specific land uses, management practices, and/or supporting policies in the planning region.

Steps in the Translator Creation Process

PROCESS FOR CREATING TRANSLATORS

▶**Identify/obtain GIS layers and associated information for land use/management and policy practices**

Identify and obtain geographic information systems (GIS) layers that represent converted lands, land use/management practices, and related policies that currently exist for the planning region. In addition, any layers that indicate proposed, potential, and/or allowed land uses and policies for the region should also be acquired. Supplemental information (e.g., digital and/or hard copy documents, personal communications) associated with the GIS layers is also very useful for creating translators. Because the goal in building translators is to assign a Vista Land Use Intent (LUI) and/or Policy Type (PT) to each land use/management and/or policy practice that occurs within the planning region, input layers should be selected that will best represent the full set of types occurring in the region with a minimum of redundancy in order to most efficiently create translators. That said, however, the full set of layers and associated information for the planning region is needed for the process of defining scenarios, and so information obtained but not used for creating translators will later be used in the scenario definition process. (See Appendix F for details on LUI categories, and Appendix G for descriptions of PT.)

Many of the different layers, along with associated information, are best obtained from the institution implementing the land use/management and/or policy in the planning region. Similarly, information on any potential or proposed land uses or policies in the region is best acquired from the institution that has developed such plans. Other sources of information include public and institutional landowners, managers, and regulatory agencies.

Along with layers and associated information, the process of creating translators requires knowledge about land use/management and policy in the planning

region. While this knowledge can often be found in descriptions associated with the GIS layers and associated planning documents obtained for the process, ”expert knowledge" is particularly useful for determining the most appropriate translation of a regional land use/management or policy type to the "standard" Vista LUI and PT.

▸Create and reformat layers as needed

The GIS layers obtained for use in creating translators may need to be reformatted (and in some cases, new ones created) to represent the set of current (and potential) land use/management and policy types utilized in the planning region. To make use of layers that have been created and maintained by different institutions typically requires some custom GIS work. The various layers must be edited to ensure compatibility in format, projection, etc., and/or new layers created (from existing layers) that better represent the various land use/management and/or policy types in the region (e.g., a new layer that aggregates different policy types into a single layer).

Note that any layers obtained for the planning region that are not used for creating translators will still need to be reformatted for use in the scenario definition process. Thus, it may be most efficient to prepare all the layers for use in both creating translators and defining scenarios at the same time, instead of preparing a subset to be used for creating translators now and then the rest later as part of the definition process.

▸Create translators using Vista

Use the Vista Translator Properties - <New> wizard to create the land use/management practices and/or policy type translators needed for the project.

Note that if a particular layer will be used to build both a land use intent (LUI) and policy type (PT) translator, the assignment of conflicting LUI and PT for a given attribute in the layer should be avoided. While the system will not compare and validate LUI and PT assigned to the same attribute, an attempt should be made to avoid illogical combinations. For example, the LUI assigned to the attribute "1401" might be "Biodiversity Conservation" while the PT assigned might be "Land use restricted by regulation"; these translation types could logically apply to the same attribute. However, if the assigned PT for that attribute was "Unrestricted from conversion to higher intensity uses", this may not make sense given the assigned LUI of "Biodiversity Conservation."

Defining Scenarios

SCENARIO DEFINITION

Objectives

The purpose of this function is to define scenarios, which consist of any map (or collection of maps) that represents a set of actual, expected, or proposed land uses and/or policies for areas within the planning region. Scenarios are currently used only in Scenario Evaluations, where they are overlaid with element distributions to assess compatibility with land use and/or the protection afforded by the policy type of different areas, as they might impact element conservation objectives.

Products

Each scenario defined generally results in a raster layer (or multiple layers if land uses are co-occurring or combined [see below]) representing Land Use Intent (LUI) categories across the region, and, optionally, another raster layer (or collection of layers) representing the Policy Types (PTs) for that region. (See Appendix F for details on LUI categories, and Appendix G for descriptions of PTs.) In cases when just LUI or PT is specified during the definition process, only a single layer will result.

The number of scenarios is unlimited but typically a user begins with defining a baseline scenario that reflects current actual land use in the region, producing a baseline LUI and/or PT layer. This scenario can then be readily copied and modified to reflect other scenarios such as a "r;policy baseline" that reflects concepts like "r;build out;" trend scenario addressing expected development patterns based on market drivers or ecological trends in fire or exotic species invasion; proposed scenarios in terms of existing proposals for transportation or development for example; and finally alternative future scenarios developed within Vista or other tools to remedy issues in the other scenarios.

The scenario report generated by Vista will provide area calculations for each combination of land use intent and policy type in the planning region. This information can be useful for tracking representation of different land uses to assure proper balance and that non-conservation land use goals are also achieved. However, the user may choose to represent land uses as conservation elements as well so that goal seeking can actually be conducted while maintaining the ability to detect conflicts with incompatible elements and other land uses.

Inputs

The scenario definition process in Vista may utilize many different inputs, depending on the available information for the planning region, to provide the required spatial and non-spatial inputs. Vista was designed specifically for this situation and contains tools to assist in the integration and cross-walking of information from multiple sources.

Sources used for the initial baseline scenario, defined by the data development team, can include:

- Data for existing "converted" (i.e., agricultural and developed) lands. What constitutes converted land is further described in the Background section below. Examples include:
  - o Recent land-use/land cover maps interpreted from aerial or satellite imagery
  - o Land use attributes for parcels obtained from local assessors' databases
  - o Detailed layers from agency owners/managers that track current land use
  - o Local knowledge about current land uses on specific tracts that can be attributed to a parcel layer through custom GIS processes
- Layers that show present (and potential or allowable) land use or management practices, generally obtained from an agency or institution. These can be quite variable depending on the complexity of land ownership and management in the planning region. Examples include:
  - o Local government land use zoning layers
  - o Land trust easement layers
  - o Local, state, or federal agency management layers
  - o Tribal reservation management layers
- Layers that show present (and potential) policy types, typically derived from the same sources as those for land use layers described above.
- Other Information, such as planning documents and expert opinion, provide details on policy types. These sources are further described in the Translators section.
- Knowledge about the dominance of any layer relative to other layers. For example, knowledge that a riparian setback layer takes precedence over land use zoning.

Additional scenarios, whether defined by the data development team or the end user, are most efficiently created by modifying an existing scenario - in most cases the baseline scenario reflecting current conditions is used - and saving it as a new scenario. This helps to ensure that all the necessary layers are included in the new scenario (e.g., converted lands layer) and that the layers are appropriately sequenced, as well as helping to reduce the time needed to define new scenarios. Typically only a small number of policies are changed from an existing scenario to a new scenario; thus, only layers that represent new, proposed, or potential land use/management and/or policy changes need to be added, or used to replace other layers, in the definition process for these scenarios. For example, when a new zoning layer becomes available, an existing scenario that includes the zoning layer

could be used to create a new, more current, scenario by substituting the revised zoning layer for the outdated layer and retaining the existing layer sequence. Another example would be when a new policy for stream setbacks is proposed; the baseline scenario could be used to create a new scenario by adding the proposed setback layer, and then sequencing it appropriately in the layer hierarchy (e.g., if setbacks take precedence over zoning regulations, then it would be placed directly above the zoning layer or higher, depending upon which other layers it has precedence over).

Utilizing land use and policy layers representing various land use and management plans maintained by different institutions typically requires some expertise in geographic information systems (GIS) in order to edit the input layers as needed to ensure compatibility in format, projection, etc. In addition to data preparation, defining a scenario requires sufficient knowledge about land use and policy types to be able to select the appropriate translators to be applied to specific layers.

The input to Vista consists of layers representing current, potential, and allowable land use and/or policy for the planning region, along with assigned translators. Note that maintaining an up-to-date baseline scenario is important for both routine and long-term planning activities for the region. This entails updating the converted lands layer on a regular basis, and keeping any land use and management plans obtained from institutions current. Cooperative use of Vista, or adoption of information standards that can allow such data to routinely and directly be input into Vista will greatly facilitate this process. Building such cooperation in the planning region for scenario definition and maintenance is, therefore, recommended.

Methods Summary

The Vista scenario definition process facilitates the translation of input layers into separate LUI and PT layers for the planning region. In addition, Vista provides the user with the flexibility to edit stored scenarios as conditions in the planning region change, thus increasing the accuracy of the LUI and PT layers produced for use in Scenario Evaluations.

Background

In order to effectively understand the impact of different land use and management practices on elements of biodiversity, Vista facilitates the definition of scenarios - alternate plans that represent different Land Use Intent (LUI) categories and Policy Types (PTs) in the planning region. A baseline scenario reflecting current conditions can be utilized in Scenario Evaluations, along with alternate views representing some possible future LUI/PT conditions in order to identify the likely impact of potential changes in land use and management practices on elements in the planning region.

In the Vista approach, characteristics of land use (i.e., what is expected to happen on the ground/water) are separated from characteristics of policy (which is what will cause the land use to happen). This allows the user to distinguish between the ecological effect of a land use on a conservation element separate from the probability that the land use will actually happen, which results from the type or reliability of the policy mechanism. Most classification systems combine these two characteristics, which makes it difficult to use the resulting information to understand why a particular area is not supporting conservation goals (is it incompatibility of the land use, or unreliability of the implementation mechanism?). Thus, while using PT is completely optional, in practice it is highly useful for determining whether the lack of goal achievement for element conservation is caused by unreliable policies (e.g., when zoning designations are overturned in local governments to allow previously unplanned development).

In practice land uses can be any phenomena that can likely be mapped now or in the future and for which element responses to it can be discerned by experts. This includes not only the typical types of land uses (agriculture, industry, housing, infrastructure) but also:

• working land management practices (e.g., forestry, prescribed fire, weed treatment)

• "natural' disturbance phenomena (e.g., wildfire, wind throw, storm surge)

• exotic species, pest, and disease invasions

Policy types represent implementing mechanisms and so may include types that are not typically mapped which can, nonetheless, be associated with spatial locations. For example there may be a conservation funding source for land acquisition in a region that is not place-specific. Using Vista's Site Explorer function, however, that funding source can be selected as the PT for implementing an alternative land use. Therefore, PTs may include not only the typical mechanisms of legislative acts, regulations, and statutes but also, for example, funding sources and targeted education campaigns.

Limitations

The scenario definition process in Vista is used to create layers that represent LUI and PT conditions for the planning region, which can then be used in Scenario Evaluations. However, because Vista will convert all data to raster format before conducting the analysis, there is a danger of losing information if the cell size is too great. This risk is of greater concern for thin linear features such as streams, rivers, or roads. See discussion in the Determining Grid Cell Size topic for additional details related to the rasterization of features.

Steps in the Scenario Definition Process

PROCESS FOR DEFINING SCENARIOS

▸Develop land use intent and policy type lists from Vista default lists

It is recommended that the Vista default lists for land use intent/management practices (LUI), and related policy types (PTs) be modified as needed for local application rather than beginning the lists from scratch. For Vista versions 2.0 and later, the LUI was adapted from the IUCN / Conservation Measures Partnership classification of land use and conservation practices, which was selected for use because it was developed through extensive partnerships and is documented and maintained on a global website.

Considerable time should be invested in developing the LUI to be used for local land use analyses, including work with partners among implementing institutions and element experts to insure that the LUI is as correct as possible. Although the LUI list can be modified at any time, any changes will require review by those with element expertise to obtain revised designations of element responses to the new or revised land use types. Because the availability of these experts is often limited, it is highly recommended that the need for such follow-up be avoided. In contrast, the policy type list can be readily modified with few ramifications as there are no dependencies to other information in Vista.

PROCESS FOR DEFINING SCENARIOS

▸Identify/obtain GIS layers and associated information for land use/management and policy practices

Identify and obtain geographic information systems (GIS) layers that represent the converted lands, land use intent/management practices (LUI), and related policy types (PTs) that currently exist for the planning region. In addition, any layers that indicate proposed, potential, and/or allowed land uses and policies for the region should also be acquired. Supplemental information (e.g., digital and/or hard copy documents, personal communications) associated with the GIS layers is also very useful for defining scenarios. (See Appendix F for details on LUI categories, and Appendix G for descriptions of PT.)

Many of the different layers, along with associated information, are best obtained from the institution implementing the land use/management and/or policy in the planning region. Similarly, information on any potential or proposed land uses or policies in the region is best acquired from the institution that has developed such plans. Other sources of information include public and institutional landowners, managers, and regulatory agencies.

Along with layers and associated information, the scenario definition process requires knowledge about land use/management and policy in the planning region, particularly knowledge about which LUI and PT layers take precedence over others. While this knowledge can often be found in descriptions associated with the GIS layers and associated planning documents obtained for the process, ”r;expert knowledge" is particularly useful for determining the layers and

sequence to be used in creating different scenarios that best represent conditions - current or potential - in the planning region.

Note that the LUI and PT layers and related information needed to define scenarios may already have been obtained during the first step of the process for creating a translator.

▶**Create and reformat layers as needed**

Create and reformat layers as needed to facilitate development and translation of spatial data and attributes.

The GIS layers obtained for use in scenario definition may need to be reformatted (and in some cases, new ones created) to represent the full set of current (and potential) land use/management and policy types utilized in the planning region. To make use of layers that have been created and maintained by different institutions typically requires some custom GIS work. The various layers must be edited to ensure compatibility in format, projection, etc., and/or new layers created (from existing layers) that better represent the various land use/management and/or policy types in the region (e.g., a new layer that aggregates different policy types into a single layer).

Note that any layers obtained for the planning region that are not used for creating translators will still need to be reformatted for use in the scenario definition process. Thus, it may be most efficient to prepare all the layers for use in both creating translators and defining scenarios at the same time, instead of preparing a subset to be used for creating translators now and then the rest later as part of the definition process.

▶**Define scenarios using Vista combine and override functionality**

Use the Vista combine and override land use functionality in the Scenario Properties - <New> window to define scenarios. Scenarios describe land use and optionally, land policy of your project area. Vista provides a translator function to allow users to crosswalks land use information from a variety of sources and then Vista will reclassify it to the user-defined land use categories. Translators and land use categories are discussed in separate sections of the Vista Help.

Diverse land use information can be brought into Vista to create a scenario (conservation lands, disturbances, infrastructure, transportation systems, etc). Typically one land use takes precedence when features from different maps overlap. For example, in a hierarchy of land uses roads are often at the top because they are the single dominant use where they occur. Occasionally however, you have cases of co-existing land uses. For example, you might have a working landscape type use such as grazing in an area expected to have an exotic plant species invasion. In this case both "uses" would be expected to co-occur. Both combined and override land uses can be included in a scenario.

Naturally, if override land uses are placed on top of combined land uses in the scenario layer stack, the override land uses will take precedence.

When using just override land uses, just one land use scenario is created. However, when using combined land uses, Vista will generate minimum number of additional scenario rasters to display each combined land use. For example, if two land uses are input as combined on top of a set of override land uses Vista will create three scenario layers: the first with just the override layers, the second with one combined land use and the third displaying the other combined land use. This functionality can be more complex to implement but can provide much more realistic results. It is important, however, to check over the outputs to verify that the combine/override rules you developed for the scenario are correct.

Scenario Evaluations

SCENARIO EVALUATIONS

Objectives

The purpose of this function is to assess the effects of various land use and/or policy conditions on specific conservation goals for a set of elements. Scenario Evaluations have two components: 1) the likely maintenance of element viability/ecological integrity by compatible land use/management practices, and 2) the implementation of land use designations guided by policy mechanisms that allow or prevent land uses of greater intensity (that would fail to protect elements). Scenarios, developed to reflect land use/management and policy conditions in the planning region, are used to evaluate the effects of existing land uses and policies on elements, and the potential impacts of proposed future conditions.

Products

Each Scenario Evaluation produces a detailed report on the scenario inputs and results, and several geographic information system (GIS) visualization layers. The report summarizes, in total and then by category, the performance of the scenario in terms of the number and percentage of elements that met conservation goals. The report also provides a detailed comparison of individual elements against the scenario: their original distribution, and the number/percentage of elements that were retained in compatible areas, and areas where the elements were both protected and compatible. The raster layers generated by the Scenario Evaluation include

1. Compatibility conflict layer, which represents the distribution of elements that were compatible at the given location such that their conservation goals we met; elements that were incompatible at the given location and whose goals were not met are also shown.

2. Protection conflict layer, which represents the distribution of elements that were both compatible and protected at the given location such that they met their conservation goals.

3. A separate layer for every element that identifies each area of the distribution according to the following categories (if policy reliability was included in the analysis):

- Unreliable and compatible (positive) element distributions; these areas do not contribute to goals.

- Unreliable and incompatible (negative) element distributions; these areas do not contribute to goals.

- Reliable and incompatible (negative) element distributions; these areas do not contribute to goals.

- Reliable and compatible (positive) element distributions; these areas contribute to goals.

Uses for Scenario Evaluations

The Scenario Evaluation is a powerful and flexible tool that indicates areas where element conservation is incompatible with land use intent (LUI) and/or where protection through policy type (PT) is inadequate for maintaining compatible land use conditions. Whether a scenario describes current LUI/PT conditions or some allowable, potential, or future conditions, Scenario Evaluations can be used in the planning process to assess the performance of an input scenario with respect to selected sets of elements and conservation goals. This analysis can be valuable in identifying which LUI/PT conditions will allow a planning region to meet its conservation goals, areas where conditions are incompatible with element conservation goals, and areas where potential land use conflicts may occur in the future. (See Appendix F for details on LUI categories, and Appendix G for descriptions of PT.) The results of a Scenario Evaluation will display all viable occurrences of elements included in the analysis coded according to compatibility, protection, and conservation goals met.

Once various scenarios have been compared, final maps and reports can be produced to aid the decision-making process. Because scenarios, elements, and conservation goals can be modified, this process can be repeated as often as needed to test alternative land use scenarios, evaluate assumptions about the reliability of particular policies to prevent changes to more intense land uses, or to incorporate new data as it becomes available. The results of Scenario Evaluations are saved and documented in Vista, which may be useful in defending regulatory decisions.

Scenario Evaluations can also be examined using the Vista Site Explorer tool to provide data on the land use and/or policy types for a selected site or sites, along with detailed information on elements occurring on the selection in terms of conservation goals achieved. Further, the Site Explorer enables

the user to examine the effects on goal achievement for elements in the selection if alternative land statuses are used.

Inputs

Each Scenario Evaluation requires an input scenario. The baseline scenario is a required input in order to assess the effects of current conditions on element conservation goals. Other scenarios that are needed to represent alternate possible future land use and policy conditions in the planning region should also be used as inputs to the evaluation process.

Along with scenarios, the evaluation process requires a high degree of interaction by the user including decisions regarding the selection of elements and the sets of goals to be evaluated. User-assigned values are another input to Scenario Evaluations, specifically

- Reliability of protection by PT for the set of elements in the evaluation (i.e., a judgment whether a particular PT will prevent land uses of greater intensity during the planning time frame, thus adequately protecting those elements); and/or
- Compatibility, by element, with different LUI categories.

Note that while the reliability of PT is not assessed until the Scenario Evaluation parameters are being defined, element LUI compatibility should have been assigned on the Compatibility tab of the Element Properties window when the element database was developed in Vista.

Methods Summary

The Scenario Evaluation process combines LUI and PT conditions in a scenario with information on which LUIs are compatible with elements and which PTs provide reliable protection. This is accomplished by intersecting element distribution layers with the LUI and PT layers previously generated for the scenario. The element distributions attributed with LUI and PT are then referenced to the existing lookup tables for element LUI compatibility and PTs specified as valid. The resulting raster layers generated by the Scenario Evaluation identify areas of incompatibility and inadequate protection in the planning region, and indicate the degree to which conservation goals for the elements were met.

Select a task below to see a detailed description of the Scenario Evaluation process.

➡ Confirm that element compatibility has been defined

➡ Create and run a Scenario Evaluation using Vista

Background

Scenario Evaluations are used in conservation planning to determine whether a scenario (i.e., a set of LUI/PT conditions) will allow conservation goals for the planning region to be achieved, and to identify areas where incompatible land uses could be changed and/or policies that afford acceptable levels of protection are needed to increase goal achievement. Specifically, Scenario Evaluations assess the number or percentage of element occurrences or area adequately protected by comparison with element conservation goals to ascertain the benefit or impact of conditions represented by the scenario. Multiple evaluations of the same scenario can be compared by altering the input designating which policies are considered to offer valid protection, the set of elements included in the evaluation (using filters), and/or the desired goals (perhaps representing minimum and preferred levels of element conservation). These variations can help determine if any particular scenario is better at meeting the goals for a particular group of elements under different assumptions about whether policies will reliably prevent land uses of greater intensity during the planning time frame. Note that in cases when an element in the Vista database has not been included in any goal sets, its conservation goal will default to 0.0 in analyses. Thus, Scenario Evaluations that include the element will falsely indicate that its goals have been met.

Once areas have been designated for conservation, they may still be managed for multiple uses, but conservation of elements of concern would be a primary consideration. To make that consideration operational, management actions would need to be compatible with the ecological processes that support targeted conservation elements in each area. So, for example, aspects of composition, structure, and dynamic processes supporting forest, riparian/wetland, and aquatic systems, and the habitat requirements of sensitive species, would be principle considerations in establishing compatible land management within these selected areas.

In Scenario Evaluations ecological and policy attributes are considered separately, leaving the subjective decision about policy reliability to the planner – an approach that is unlike other systems for evaluating element protection, such as the Stewardship Map of the U.S. Geological Survey Gap Analysis Program or the IUCN Protected Area Management Categories. Also, unlike the IUCN system, category assignments are made without any assumptions about the physical ability of an area to meet conservation goals, but rely instead on the Vista spatial analysis to assess that capability uniquely for each land unit.

Limitations

Scenario Evaluation in Vista is intended to provide an indication of the degree to which conditions represented by a scenario support conservation

goals for elements. It should not be used as a substitute for ground surveys, specific site design review, or expert opinion when element viability/ecological integrity must be ensured because:

- It makes use of simplified and generalized assumptions about compatibility between land uses and element viability/ecological integrity, and
- It may not incorporate specific and current information on species demographics or the viability/ecological integrity of elements.

Vista currently lacks the ability to calculate two important measures in conservation, specifically:

- Irreplaceability of land units to meet goals, which relates to how many options exist for achieving goals. A land unit containing an occurrence of an element with a conservation goal of 100% is essential for meeting that goal, and would be ranked 100% irreplaceable. As the options for achieving goals increase, irreplaceability values decrease.
- Complementarity of land units to contribute to goals, which refers to the degree to which a unit can represent elements not already conserved elsewhere in the planning region. A land unit that can be used to conserve occurrences of five elements for which goals are not already met, when compared with another unit that contains three such occurrences, will have a higher complementarity value.

Irreplaceability and complementarity are currently very difficult to infer with no direct processes for calculating them. However, some expert tools exist that can be used to derive values for these conservation measures. NatureServe Vista support staff can provide services that utilize such tools to obtain values, and then integrate the results with Vista output.

The freedom to determine what combinations of land use compatibility and policy types define protection for elements in a Vista project is an important advantage over other regional, state, and national conservation projects, which typically do not allow any consideration of local policies. However, it is also an enormous responsibility on the part of the user to create a realistic definition of protection and to be conservative about the true nature of land use/management practices and policies in the planning region. A conservative approach will, at worst, demonstrate less protection than currently exists, and can be easily corrected. However, a less moderate approach that validates policies which are, in practice, unreliable for protecting elements may indicate that conservation goals have been achieved while elements are actually at serious and permanent risk.

Steps in the Scenario Evaluation Process

PROCESS FOR EVALUATING SCENARIOS

▶**Confirm that element compatibility has been defined**

Confirm that compatibility has been assessed for elements to be included in the evaluation. If not yet assessed, indicate compatibility with land use intent (LUI) types for each element using the <u>Compatibility tab</u> on the <u>Element Properties window</u>.

▶**Create and run a Scenario Evaluation using Vista**

Use the Vista <u>Evaluate Scenario - <New> window</u> to specify the scenario to be used, as well as the category system, filter, and/or goal set, to create the new evaluation, and then run the analysis.

Windows for Scenario Evaluations

EVALUATE SCENARIO WINDOW

The **Evaluate Scenario- <New>** window is displayed either by selecting **Evaluate Scenario...** from the NatureServe Vista menu or clicking the **Evaluate...** button on the <u>Scenario List window</u>. This window is utilized for evaluating different land use and conservation scenarios (see the <u>Scenario Evaluations</u> section for more detailed information).

Note that the 🗋 button located next to an item can be used to record additional information related to that item (see the <u>Documentation Window</u> topic for more details).

Evaluate a scenario:

1. Enter a name for the evaluation being performed in the **Name** field. The **<New>** on the window title will change to the name of the new scenario evaluation as the entry is typed in.

2. Enter a brief description for the new evaluation in the **Description** field.

3. Select the scenario to be evaluated from the **Scenario** drop-down list, or select the **<Add New...>** value to develop a new scenario, or the **<Show List...>** value to display all developed scenarios (in order to select and modify an existing scenario).

4. Select the Filter (which determines the elements to be included in the evaluation) from the **Filter** drop-down list, or select the **<Add New...>**

value to create a new Filter, or the **<Show List...>** value to display all existing filters (in order to select and modify an existing filter).

5. Select the Goal Set for the evaluation (which will be used to assess whether viable element occurrences are adequately conserved in different locations) from the **Goal set** drop-down list, or select the **<Add New...>** value to create a new Goal Set, or the **<Show List...>** value to display all existing goal sets (in order to select and modify an existing set of goals). Note that to evaluate multiple goal sets, a separate evaluation will need to be created for each set.

6. Click the **Preview Elements...** button to see a Filtered Goal Set Report showing the set of elements to be included in the evaluation and the goals that have been set for these elements, based on the values selected in the **Filter** and **Goal Set** fields. This knowledge can be helpful prior to running the scenario evaluation. The greater the number of elements included in an evaluation, the longer it will take to process; adjusting/creating a filter that will limit the evaluation to just those elements that are needed will ensure the most efficient use of processing time.

7. Indicate whether the scenario will be evaluated for compatibility of elements with the land uses (indicated on the Compatibility tab of the Element Properties window) and/or for protection in the region by checking one or both of the **Element/Land Use Compatibility** and **Effective Element Protection** checkboxes.

8. If element protection will be evaluated (denoted using the **Effective Element Protection** checkbox in the previous step), indicate which policy types are considered to reliably protect viable occurrences if elements in the scenario during the planning time frame by utilizing the appropriate checkboxes in the **Reliable Policy Types** section. To check all the boxes with one keystroke, click the **Mark All** button; clicking the **Clear All** button will remove any checkmarks from the boxes. At least one protection type must be selected as valid for the evaluation or an error indicator⊕ will be displayed.

This is a subjective process that separates scientific knowledge (land use intent [LUI] compatibility) from sociopolitical considerations (policy types [PT]). Whether a particular policy provides adequate protection for viable occurrences of elements is determined by judging the degree to which the policy mechanism guides the implementation of LUI designations, allowing or preventing land uses of greater intensity (that would fail to protect viable occurrences). For example, a zoning policy may be generally reliable in enforcing a particular land use but, because it can be changed with relative ease, it may not effectively insure implementation of a particular LUI over the planning time frame; thus, it may not offer adequate protection for viable occurrences from a conservation perspective. In comparison, lands held by nongovernment conservation organizations are typically managed for much less intense uses than are allowed under the local zoning regulations; such lands would, thus, offer better protection for viable

occurrences than the allowable uses that would likely occur with different ownership/management.

Any assumptions made in designating specific PTs as reliable for protection should be documented (e.g., "zoning is now more strictly enforced than it was in previous years, and so was designated 'reliable' in this project"). The ability to designate different PTs as reliably providing protection can be used to test the benefits of enforcing particular policies in the planning region by creating separate evaluations for different combinations of reliable PTs and then comparing the results.

9. Specify a layer to be used in Site Analyses from the drop-down menu of the **Site Layer** field, or by using the 🗗 ArcCatalog button to browse to the layer. The land units in the layer selected will be used for detailed examination of land use/policy type and element goals by unit.

10. Indicate how the Scenario Evaluation report should be summarized by selecting a category system from the **Categorize By** drop-down list, or selecting the **<Add New...>** value to create a new system, or the **<Show List...>** value to display all existing category systems (in order to select and modify an existing system).

11. Select a map context to be used in creating the scenario evaluation report from the **Map Context** drop-down menu, or select the **<Add New...>** value to create a new map context, or the **<Show List...>** value to display all existing map contexts (in order to select and modify an existing context).

12. Generate the Scenario Evaluation by clicking **OK**; otherwise press **Cancel**. Results are displayed in a Scenario Evaluation report. See the Scenario Evaluation report for more detailed information.

Note: The grid cell size used to create the visualization layers generated by the Scenario Evaluation is set on the Spatial tab of the Element Properties window. If that cell size differs greatly from the cell size specified for the scenario used in the evaluation (set in the Scenario Properties window), the visualization layers may not overlay the scenario correctly.

Edit a Scenario Evaluation:

1. Select the Scenario Evaluation from the NatureServe Vista Table of Contents (TOC), right-click, and choose **Scenario Evaluation Properties...** from the context window. The resulting window displays the evaluation.

2. Edit the Scenario Evaluation using the processes described above for creating a new evaluation as guidelines.

3. Generate the revised Scenario Evaluation by clicking **OK**; otherwise press **Cancel**.

REFRESH SELECTED RESULTS WINDOW

The **Refresh Selected Results** window can be opened several ways, depending on the item(s) to be refreshed.

- To display the Refresh Selected Results window listing all items that can be refreshed in the project (that is, elements, Conservation Value Summaries (CVS), and Scenario Evaluations, seen by scrolling down the list), click **Refresh Results...** from the NatureServe Vista menu.

- To display the Refresh Selected Results window listing only elements in the project to be refreshed, click the **Refresh...** button on the Element List window, or right-click on the major heading "Elements" on the NatureServe Vista tab in the Table of Contents (TOC) and choose **Refresh Results...** from the context window.

- To display the Refresh Selected Results window listing only CVS in the project to be refreshed, click the **Refresh...** button on the Conservation Value Summary List window.

- To display the Refresh Selected Results window listing only scenarios and Scenario Evaluations in the project to be refreshed, click the **Refresh...** button on the Scenario List window or the Scenario Evaluation List window, or right-click on the major heading "Evaluations" on the NatureServe Vista tab in the TOC and choose **Refresh Results...** from the context window.
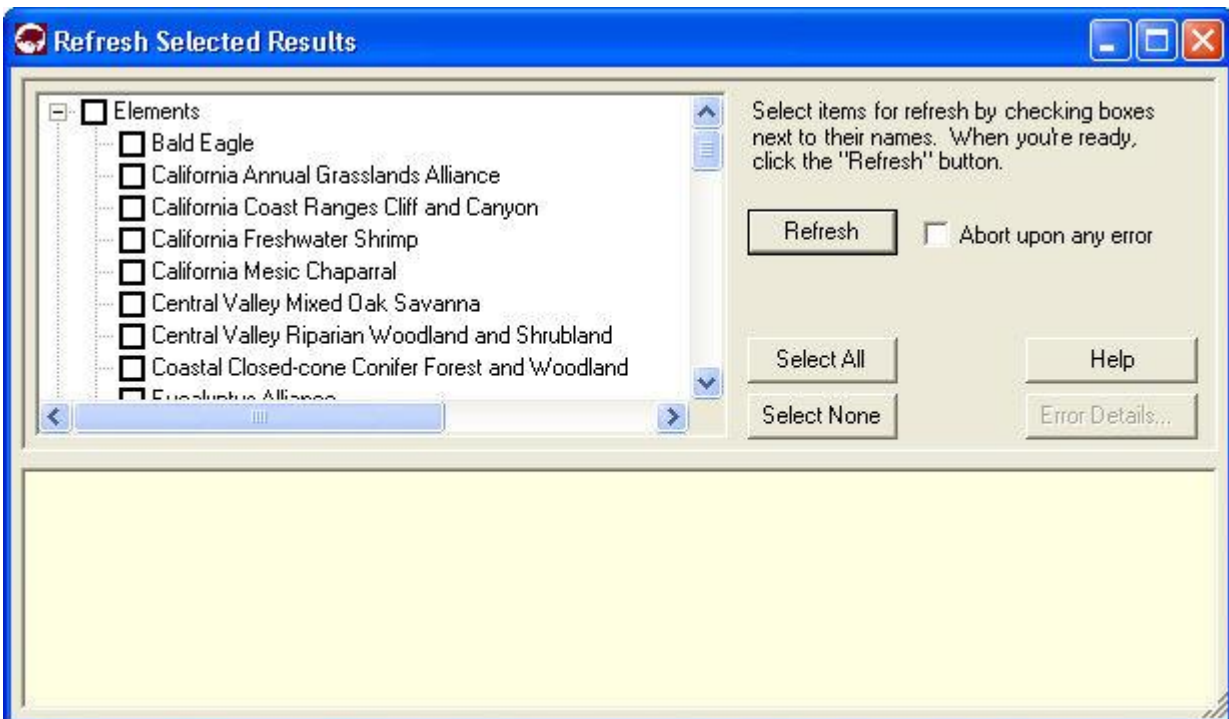
Refresh data:

1. Indicate which data are to be refreshed by using the check-box(es) associated with the element(s) and/or project analyses. The **Select All**

button can be used to select the entire list of items; using the **Select None** button will de-select any items that have been selected.

2. Indicate whether the refresh process should be cancelled if an error should occur using the **Abort upon any error** checkbox.

3. Click the **Refresh** button to begin the data refresh process.

If the refresh process completes without errors, the following message is displayed:

If an error occurs during the refresh, the following message will be displayed
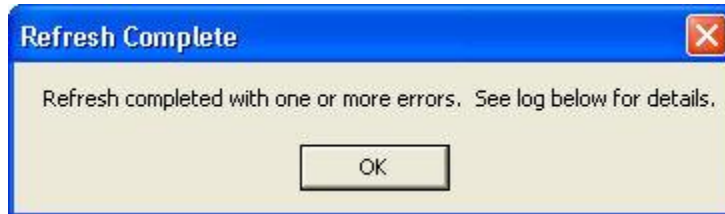
and an error log will be displayed in the lower half of the Refresh Selected Results window.
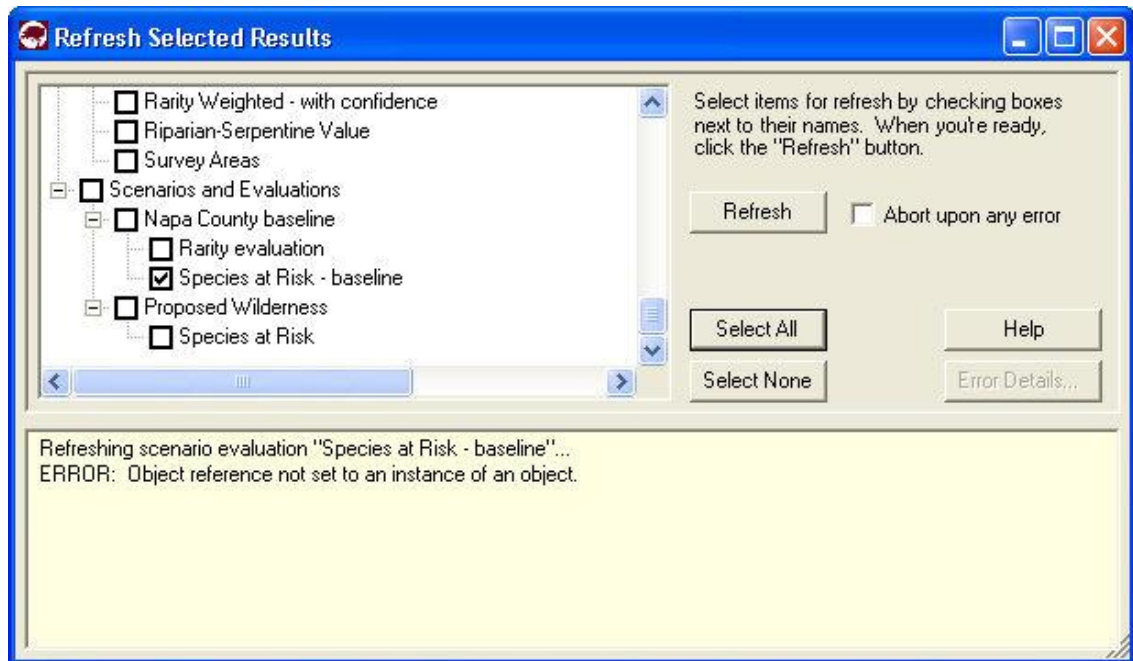
If more detailed information on the error(s) encountered is desired, click on the error log and then click the **Error Details...** button to display an Error Detail window.

_____

Note that elements, CVS, and Scenario Evaluations in the project can be refreshed *without* opening the Refresh Selected Results window. To accomplish this, right-click on a single element or analysis on the NatureServe Vista tab of the Table of Contents and select **Refresh Result** from the context menu. A Confirm Processing window will be displayed.
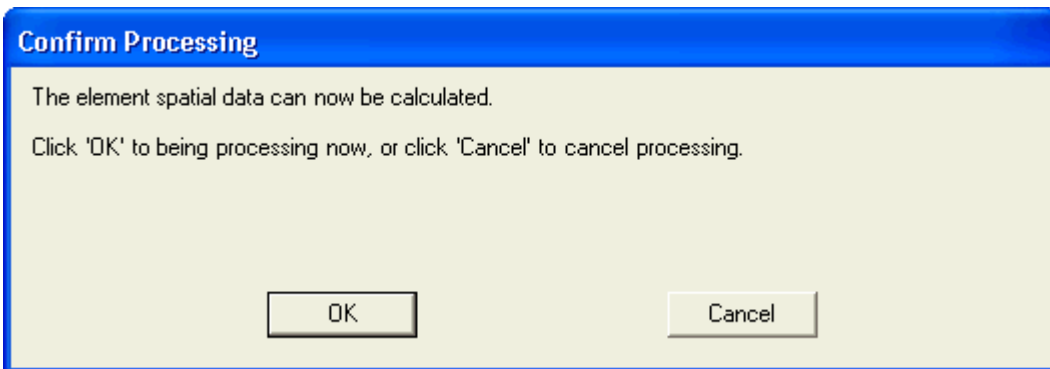
Click **OK** to continue with the refresh process; otherwise, click **Cancel**.

Scenarios in the project can also be refreshed *without* opening the Refresh Selected Results window. To accomplish this, right-click on a single scenario on the NatureServe Vista tab of the Table of Contents and select **Refresh Result** from the context menu. A Refresh Evaluations? window will be displayed.

Click **Yes** to refresh both the scenario as well as any Scenario Evaluations that utilize the scenario; click **No** to refresh only the scenario; otherwise, click **Cancel**.

SCENARIO EVALUATION LIST WINDOW

The **Scenario Evaluation List** window is displayed by selecting **Lists ▸ Scenaria Evaluation List...** from the NatureServe Vista menu. This window lists all the Scenario Evaluations that have been created for the project. See the Conservation and Land Use Scenarios section for more detailed information on this analysis.
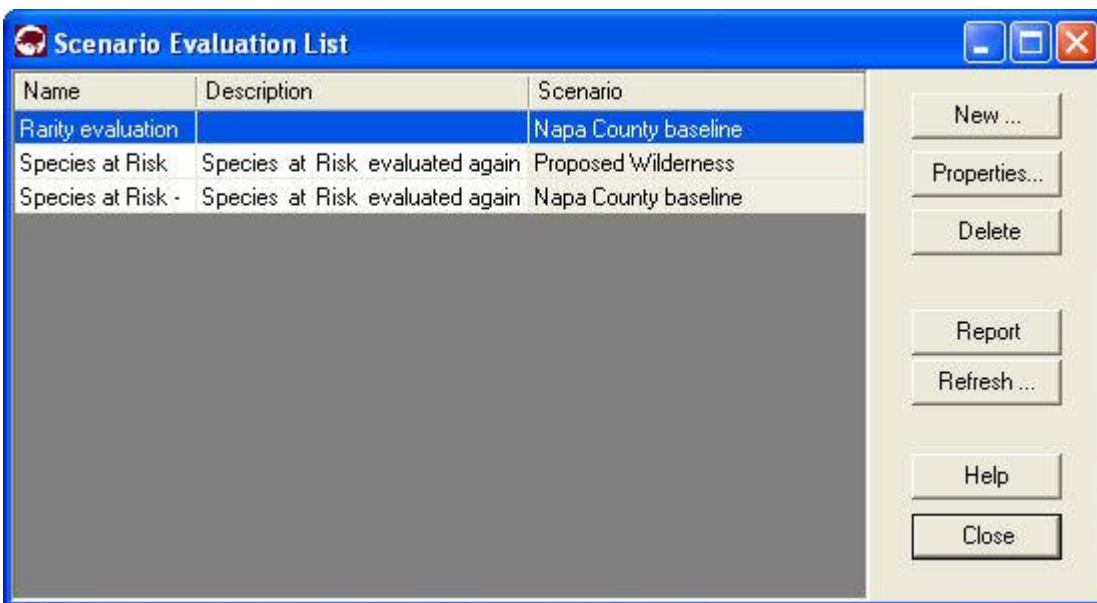
Button functions:

New... displays a new Evaluate Scenario window that can be used to develop a new evaluation for the project.

Properties... displays the Evaluate Scenario window showing details and allowing edits to the analysis selected in the list.

Delete deletes the Scenario Evaluation selected in the list.

A **Confirm Delete** window is displayed before the deletion is implemented.

Confirm Delete

Are you sure you want to delete the scenario evaluation, "Rarity evaluation"?

[Yes]   [No]
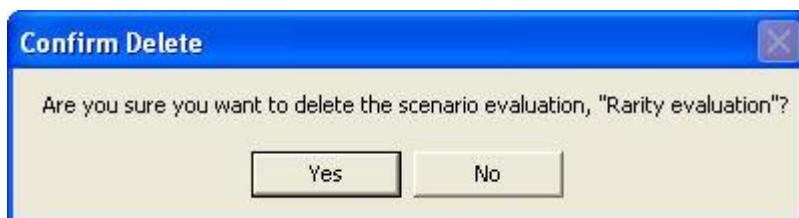
Report displays a report for the selected Scenario Evaluation that displays the land use or policy scenario that was evaluated in terms of element goals. See the Reports section for more details on Scenario Evaluation reports.

Refresh... displays the Refresh Selected Results window that can be used to refresh the data for selected Scenario Evaluation.

Help opens the on-line documentation.

Close closes the window.

Columns displayed:

Name - name of the Scenario Evaluation.

Description - description of the evaluation, if any.

Scenario - name of the scenario used in the evaluation.

SCENARIO LIST WINDOW

The **Scenario List** window is displayed by selecting **Lists ▸Scenario List** from the NatureServe Vista menu. This window lists all the scenarios that have been imported into the project. See the Land Use and Conservation Scenario Evaluations section for more detailed information on defining and using scenarios.
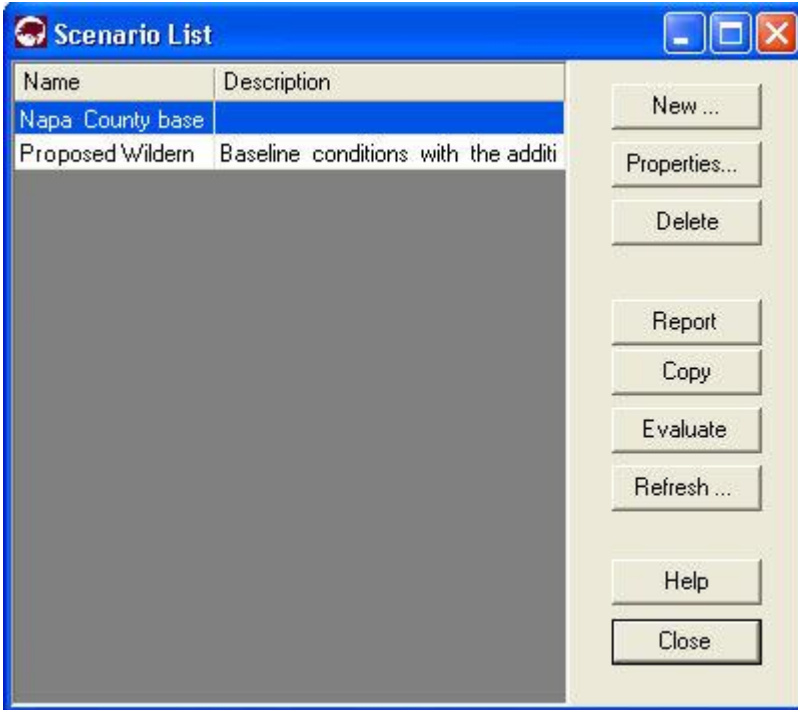
Button functions:

New... displays a new Scenario Properties window that can be used to define a new scenario to be imported into the project.

Properties... displays the Scenario Properties window showing details and allowing edits to the scenario selected in the list.

Delete deletes the scenario selected in the list.

A **Confirm Delete** window is displayed before the deletion is implemented.

A **Cannot Delete** window is displayed in cases when the scenario is referenced by one or more Scenario Evaluations, as shown in the following example.
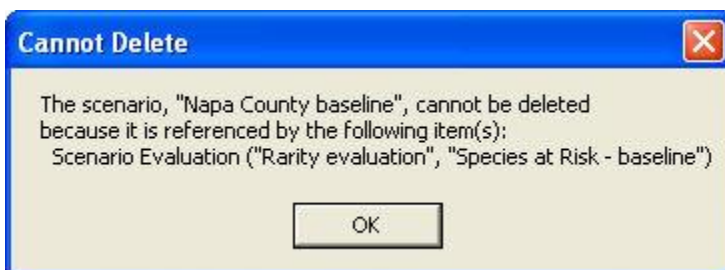
Report displays a report for the selected Scenario that displays the settings used to create the scenario. See Reports section for more details on Scenario reports.

Copy creates a copy of the scenario selected in the list, which can then be edited to create a new scenario for import.

Evaluate opens a new Evaluate Scenario window that uses the scenario selected in the list.

Refresh... displays the Refresh Selected Results window that can be used to refresh the data for the selected scenario.

Help opens the on-line documentation.

Close closes the window.

Columns displayed:

Name - name of the scenario.

Description - description of the scenario, if any.

SCENARIO PROPERTIES WINDOW

The **Scenario Properties - <New>** window is displayed by either clicking the **New...** button on the Scenario List window or choosing **Define Scenario...** from the NatureServe Vista menu. The new properties window is used to define new scenarios that can be utilized in Land Use and Conservation Scenario Evaluations. Note that typically a baseline scenario (representing current conditions in the planning region) will be defined first. See the section on Scenarios for more detailed information on defining and using scenarios in analyses.

New scenarios can be defined using scenarios that have already been developed in Vista. The process for defining a new scenario based on an existing one involves first copying the existing scenario using the **Copy** button on the Scenario List window, and then renaming and modifying the copy in the Scenario Properties window before defining it as a new scenario (see the section below on editing a scenario for more details).

Override nodes function in order of precedence. If layers are stacked in an Override node and there are instances of overlap between the layers, whichever layer is higher in the scenario list, will override, or trump the one below it.

Combine nodes function as additive features. Any number of land uses can exist in one place if they are stacked in a Combine node. Element compatibility and response to multiple land uses is discussed in the Scenario Evaluations section of this manual.

Note that the button located next to an item can be used to record additional information related to that item (see the Documentation Window topic for more details).
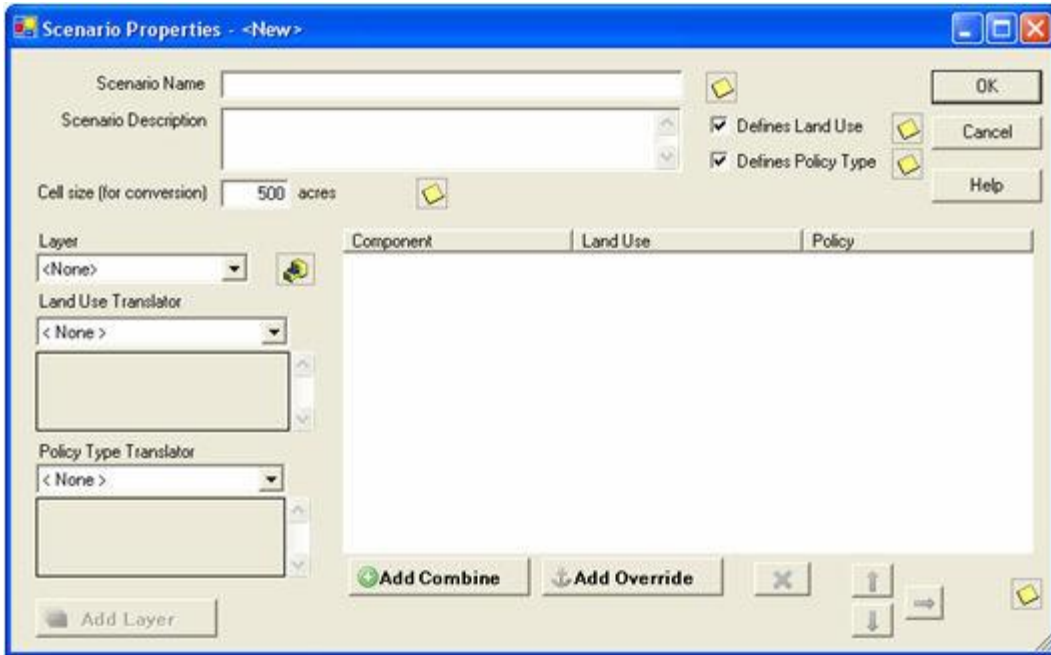
Define a scenario:

1. Specify a name for the new scenario in the **Name** field. The **<New>** on the window title will change to the name of the new scenario as the entry is typed in.

2. Enter a brief description of the scenario in the **Description** field, if desired.

3. Indicate whether both land use and policy type evaluations will be performed using the scenario (the default), or only a single type of evaluation will be performed, by using the **Defines Land Use** and/or **Defines Policy Type** checkboxes.

4. If desired, edit the value in the **Cell size (for conversion)** field, which displays the default grid cell size specified for the project in the Project Properties window. Note that if this cell size differs greatly from the cell size used to create the visualization layers generated by a Scenario Evaluation (which are set in the Spatial tab of the Element Properties window), the visualization layers may not overlay the scenario correctly. For a discussion of optimal cell size to be used for a planning project, see the Determining Grid Cell Size topic.

5. Select a layer to be added to the scenario from the drop-down list in the **Layer** field, or by using the ![ArcCatalog button] ArcCatalog button. Values in the drop-down list are determined by what is in the Table of Contents (TOC), or a subset thereof (by layer type). If the ArcCatalog button is used, a Select Polygon or Raster Input window is displayed; browse to the appropriate layer, select, and click the **Add** button.

6. Select the translator(s) to be applied to the selected layer for this scenario.

    - If land use evaluations will be performed using the scenario, select the land use translator to be applied to the layer from the **Land Use Translator** drop-down list, or select the **<Add New...>** value to create a new translator, or the **<Show List...>** value to display all existing translators (in order to select and modify an existing translator).

    - If policy type evaluations will be performed using the scenario, select the policy translator to be applied to the layer from the **Policy Type Translator** drop-down list, or choose the **<Add New...>** or **<Show List...>** values as described above.

    The box below the drop-down list will display information on the selected translator.
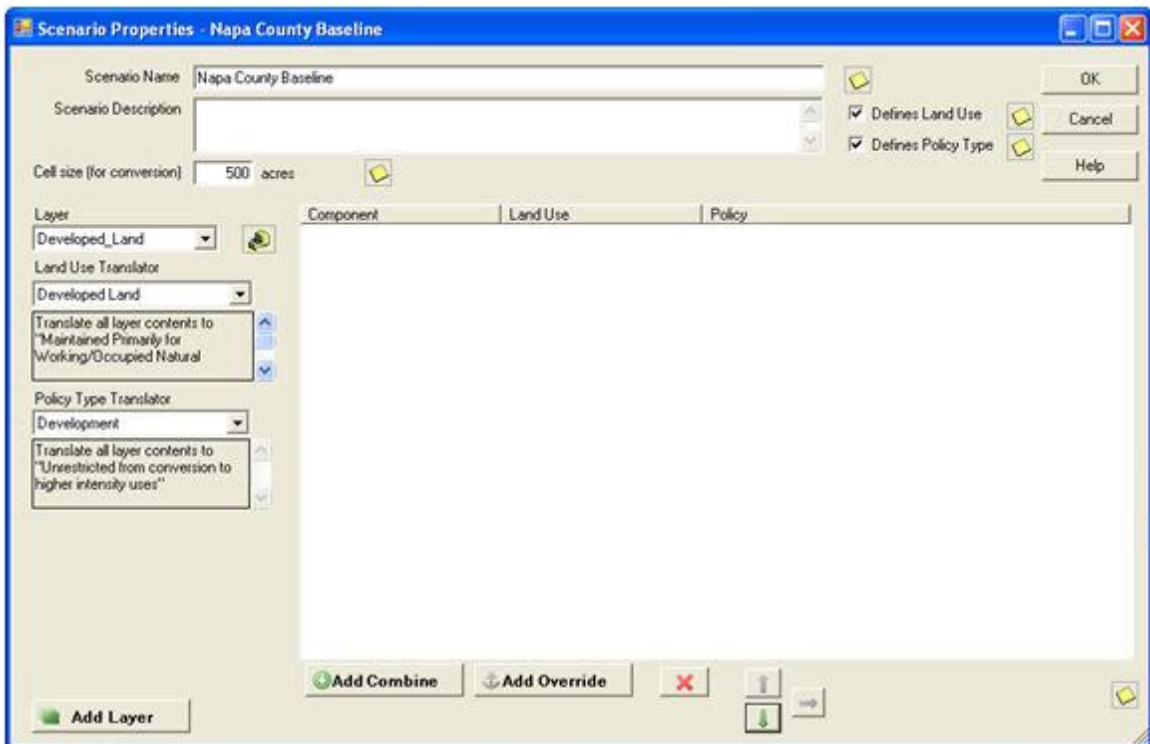
If a selected translator was defined on the basis of attributes that are not contained in the layer, the following message may be displayed:
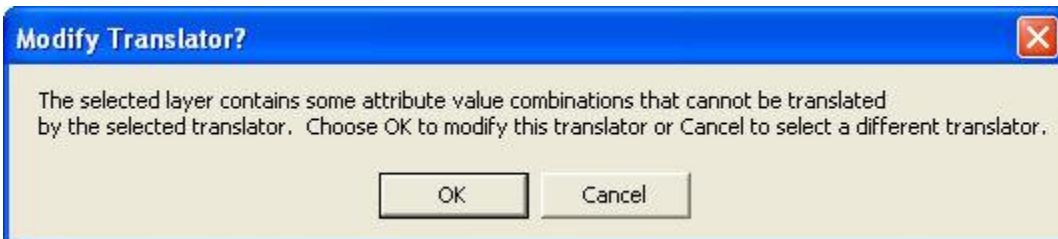
Click **OK** to edit the translator to add translations for the attributes that are lacking; otherwise, click **Cancel** to choose another translator.

7. When the selection of either or both translators for the layer has been completed, decide whether the land use layer overrides other land uses or whether it is a co-occuring land use using the ⚓Add Override or ⊕Add Combine buttons respectively (See [Define scenarios using Vista combine and override functionality](#) for more information). Click the 🔲 Add Layer button to add the layer, along with the selected translator(s), to the Scenario Layers grid.
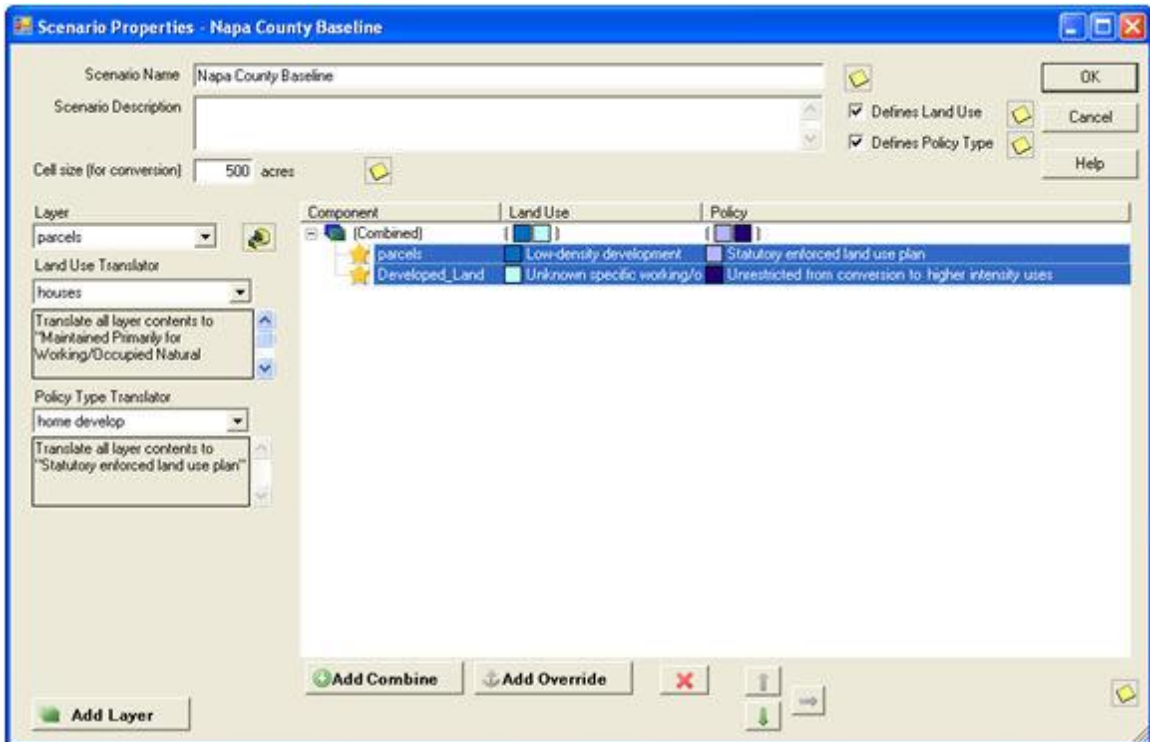
8. Continue the process of selecting layers, specifying translator(s) for them, and then adding them to the grid as desired for the scenario. Note that the same layer can be reused in the scenario, as long as the associated translator(s) are different each time. Similarly, the same translator can be reused in the scenario, as long as the layer(s) to which it is applied are different each time.

Note: It is important to include the boundary layer specified for the project in every scenario, with all features of both the Land Use and Policy Type attributes translated to the single value "Unknown." If such translators have not yet been created, use the **<Add New...>** value in both the Land Use and Policy Type Translator drop-down lists to create new translators to accomplish this (as described in step 6 above). Including the project boundary layer with these translations in all scenarios will insure that no area within the project boundary will fall out as "unspecified" in a [Scenario Evaluation](#).
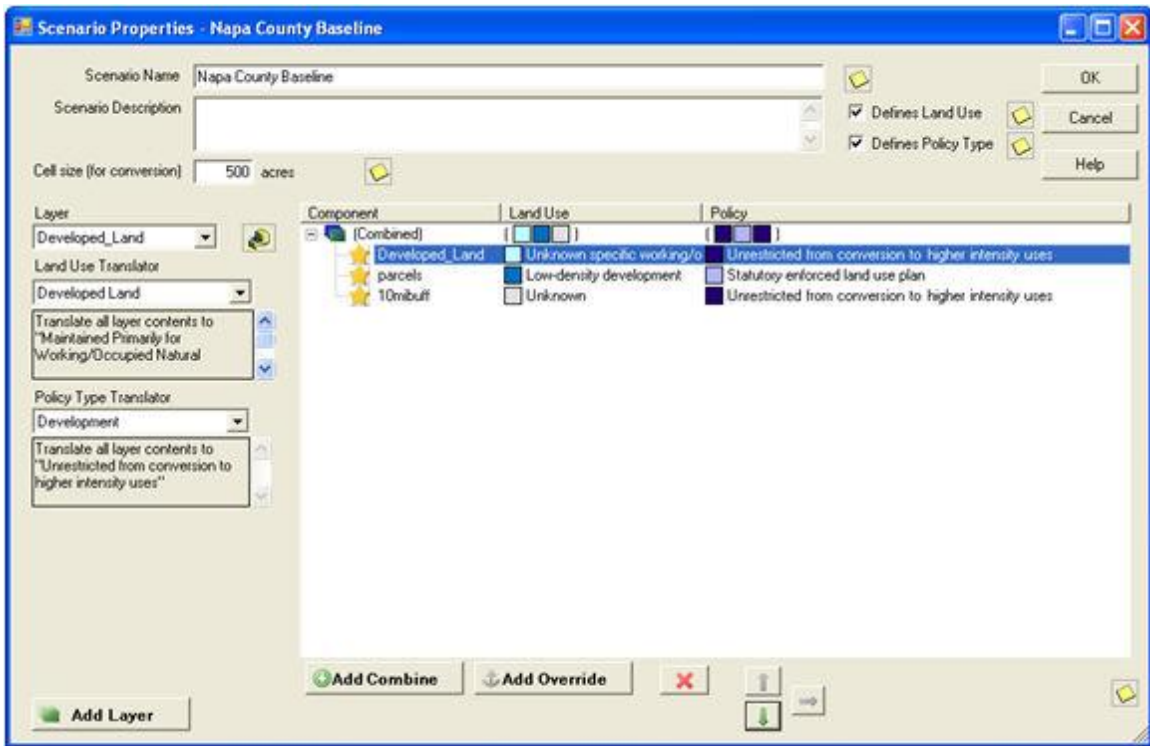
9. Use the up and down arrow buttons to change the order of layers in the grid as needed to ensure that LUI and/or PT attributes for overlapping areas are obtained from the layer representing the dominant policy. Because data is processed beginning with the first layer in the list, then the second, third, and so forth, each layer takes precedence over (i.e., modifies) the layer directly below it. Thus, layers should be sequenced so that those representing dominant policies (or those that are not subject to such policies) are placed higher than subordinate layers. In almost all cases, the dominant layer in a planning region should be a converted lands layer, since changes in policy will rarely result in making such lands immediately compatible with biodiversity.

Note: The project boundary layer in which all features are translated to LUI and PT values of "Unknown" should always be positioned at the bottom of the list, that is, as the "base" layer.

10. To delete a selected layer, use the **X** button.

11. To close the window and save the developed scenario click **OK**; otherwise, click **Cancel**.

The Scenario Properties window can be used to edit existing scenarios, for example, in cases when data sources have been changed in the project after scenarios were first defined. This window can also be used to define a new scenario using an existing one (e.g., the baseline scenario). However, the existing scenario must first be copied using the **Copy** button on the Scenario List window before being renamed and modified in the Scenario Properties window. Making changes to the name and other information for an existing scenario rather

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than to a copy will result in actual modifications to the original scenario instead of a separate, new scenario.

Typically the baseline scenario is first defined, next copied, and then the copy modified (as described below) to define other scenarios, although any scenario can be used as the basis for a new one.

Edit an existing scenario:

1. Select the scenario to be edited, or the copy of a scenario to be used for defining a new one, from the list on the [Scenario List window](#) and click the **Properties...** button, or select the scenario from the NatureServe Vista Table of Contents (TOC), right-click, and choose **Scenario Properties...** from the context window. The resulting properties window displays the scenario.

   In cases when data sources have been changed in the project after the scenario was originally defined, the following message may be displayed:
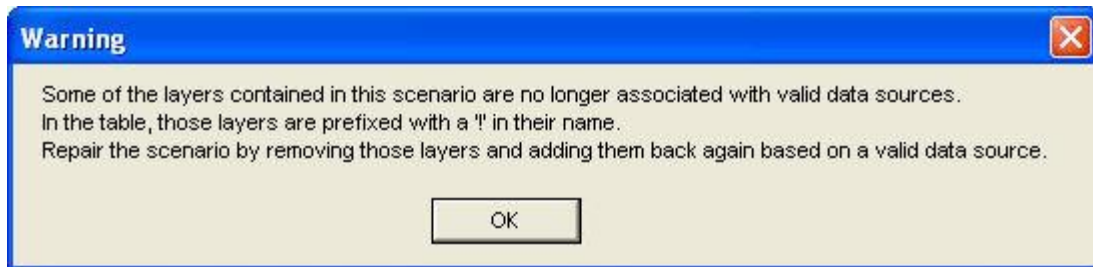
   In such cases, click **OK**; edit the scenario by removing the layers lacking data sources and then redefining the scenario so that the layers utilized have valid sources.

2. Edit the scenario using the processes described above for defining a new scenario as guidelines.

   If the type of translator (i.e., land use or policy type) is changed, the following message may be displayed:
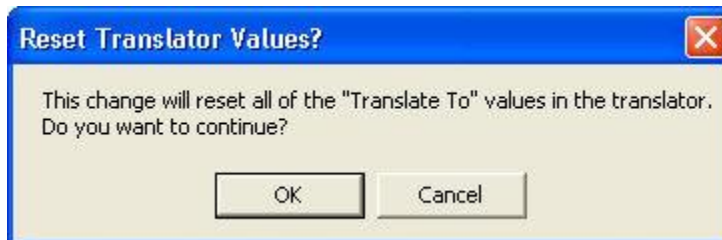
   Click **OK** to continue with the revision and the previously assigned values for attributes will be deleted; otherwise, click **Cancel**.

   In cases when the newly specified layer is lacking attributes previously defined for the translator, the following message may be displayed:
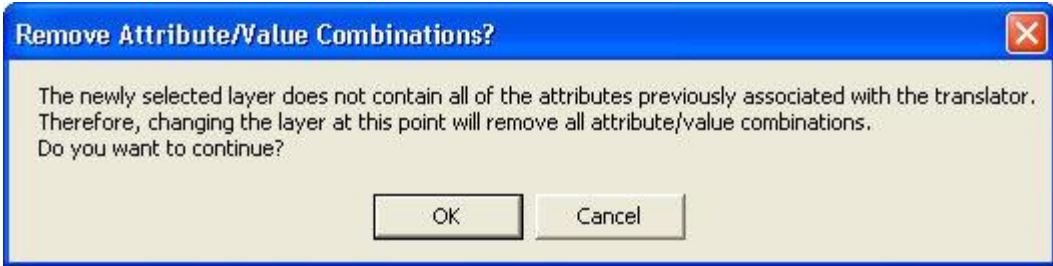
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Click **OK** to continue with the revision and the previously assigned values for attributes will be deleted; otherwise, click **Cancel**.

In cases when a translator cannot translate all of the attributes in the newly specified layer, the following message may be displayed:
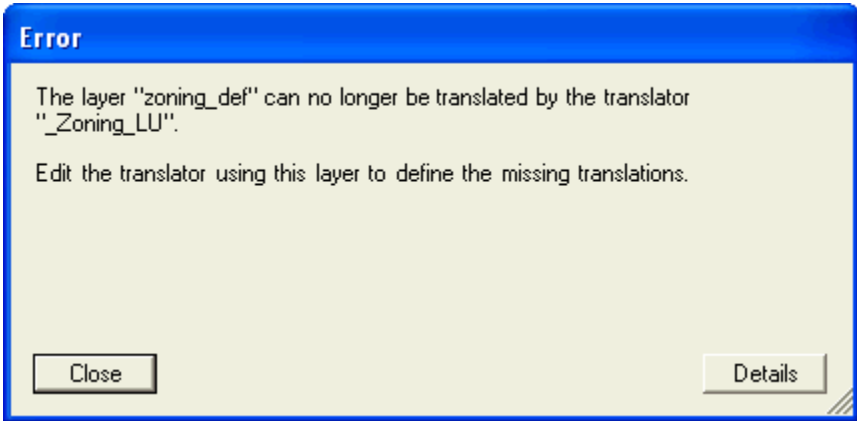
In such cases, click **Close** to cancel the process, or **Details** to view information on the error.

3. To close the window and save the edited scenario click **OK**; otherwise, click **Cancel**.

If **OK** was clicked to save the revised scenario, one of the following messages may be displayed:
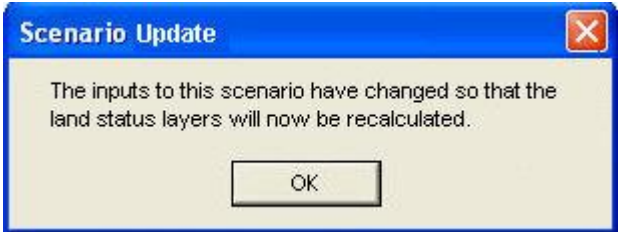
Click **OK** to continue with the revision, and layers in the scenario will be recalculated; otherwise, click **Cancel**.
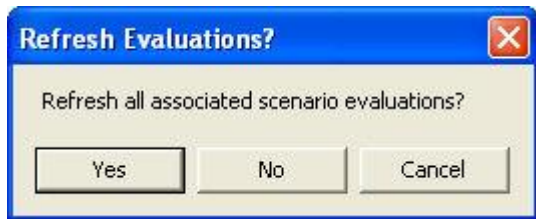
Click **OK** to refresh the Scenario Evaluations that utilize the scenario; **No** if evaluations should not be refreshed; otherwise, click **Cancel**.

EDIT LAND-USE INTENT WINDOW

The **Edit Land-use Intent** window is displayed by selecting **Lists ▸Land Uses List...** from the NatureServe Vista menu. This window displays the default Vista land use intent (LUI) categories (described in Appendix F), which are utilized in land use and conservation Scenario Evaluations.

This window is used to customize the LUI categories in order to better capture the important conservation impacts of specific land uses and/or management practices in the planning region. LUI categories are used specifically in assigning land use compatibility for elements (described under the Compatibility tab section of the Element Properties window), and for developing translators that are used to define land use scenarios (described in the Translators section, with details on creating translators found in the Translator Properties window topic).

Button functions:

OK saves changes made to the LUI categories and closes the window.

Cancel closes the window without saving any changes made to the LUI categories.

Help opens the on-line documentation.

Add Peer adds a new LUI category at the same hierarchical level as that of the selected land use. The new category will appear as a new entry at the end of existing LUI categories at that level, and can then be labeled as desired. In the following example, selecting the minor category "Biodiversity conservation" and clicking the **Add Peer** button will result in a new LUI category at the same level, added after those already existing beneath the "Maintain Primarily for Natural Values" major category to which it belongs.
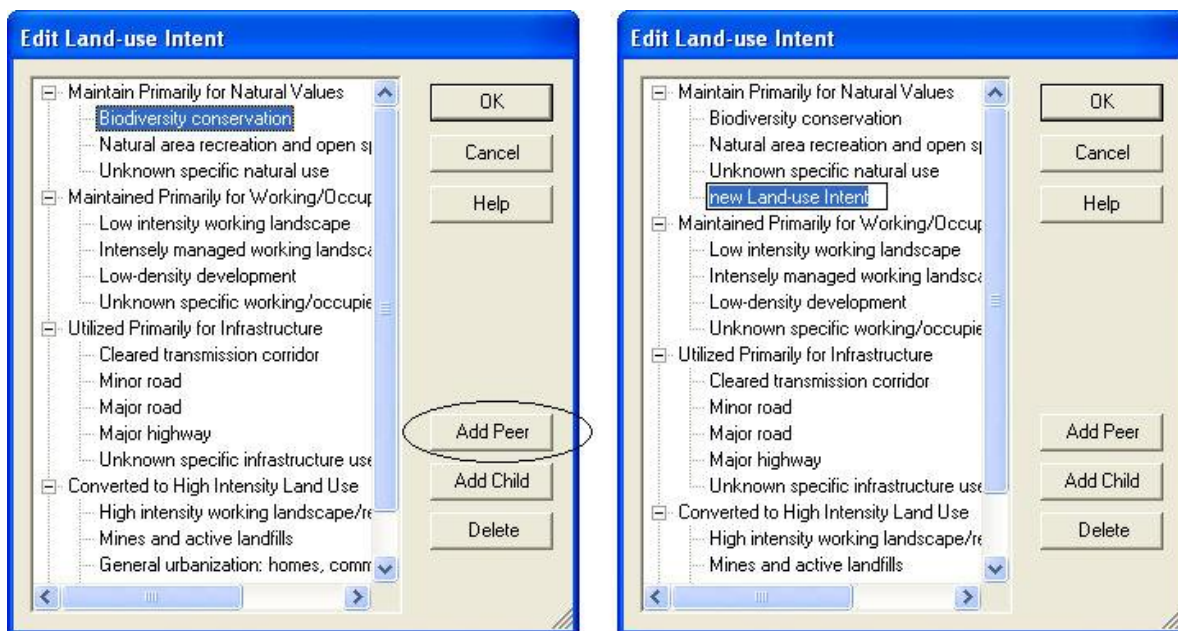
Add Child adds a new LUI category within, or under, the hierarchical level of the selected land use. The new category will appear as a new entry at the end of any existing child categories beneath the selected category, and can then be labeled as desired. In the following example, selecting the LUI category "Unknown specific natural use" and clicking the **Add Child** button will result in a new child land use category within/under that selected LUI.
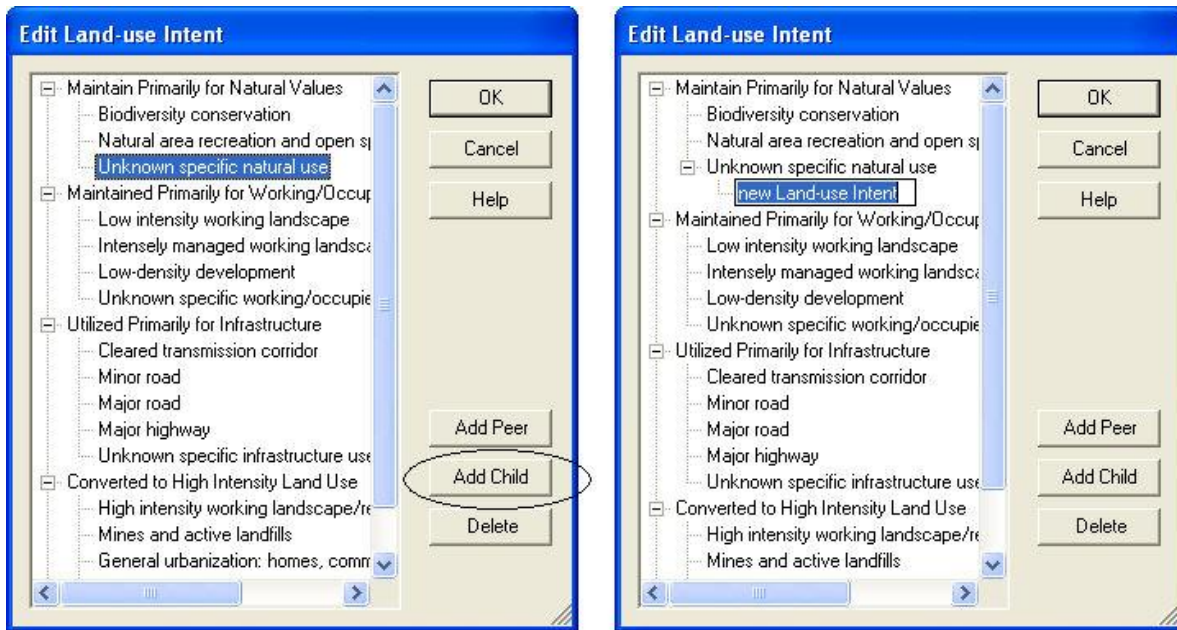
Delete deletes the land use category selected in the LUI hierarchy.

A **Confirm Delete** window is displayed before the deletion is implemented. In cases when the LUI selected for deletion contains child (minor) categories, the **Confirm Delete** window informs the user so that inadvertent deletion of these subcategories can be avoided.

A **Cannot Delete** window is displayed in cases when the LUI category is referenced by one or more items, as shown in the following example.


EDIT POLICY TYPE WINDOW

The **Edit Policy Type** window is displayed by selecting **Lists ▸ Policy Type List...** from the NatureServe Vista menu. This window displays the default Vista policy type (PT) categories (described in Appendix G), which are utilized in land use and conservation Scenario Evaluations.

This window is used to customize the PTs in order to better capture the important conservation impacts of specific policy mechanisms in the planning region. PTs are used specifically for developing translators that define policy scenarios

(described in the Translators section, with details on creating translators found in the Translator Properties window topic).
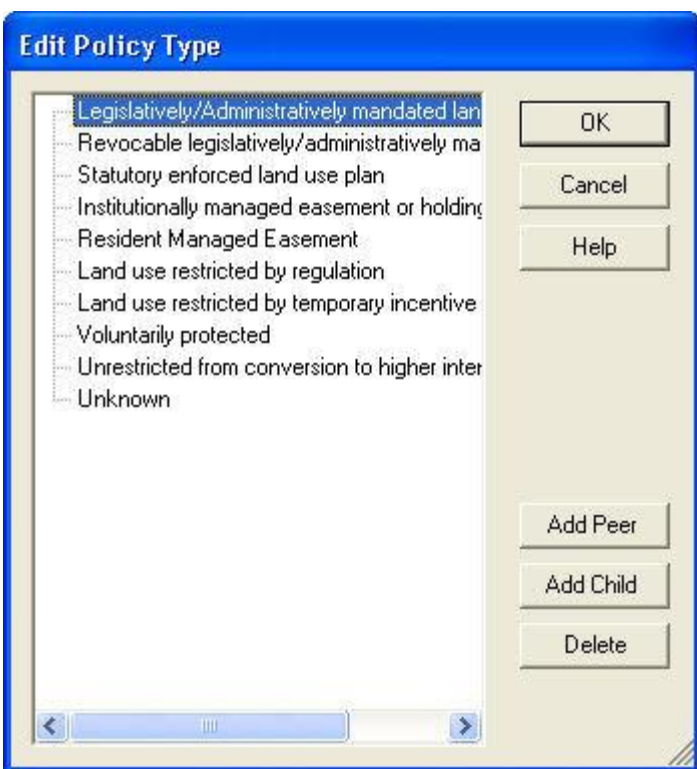
Button functions:

OK saves changes made to the PTs and closes the window.

Cancel closes the window without saving any changes made to the PTs.

Help opens the on-line documentation.

Add Peer adds a new PT at the same hierarchical level as that of the selected type. The new PT will appear as a new entry at the end of existing PTs at that level, and can then be labeled as desired. In the following example, selecting the type "Voluntarily protected" and clicking the **Add Peer** button will result in a new PT at the same level, added after those already existing.
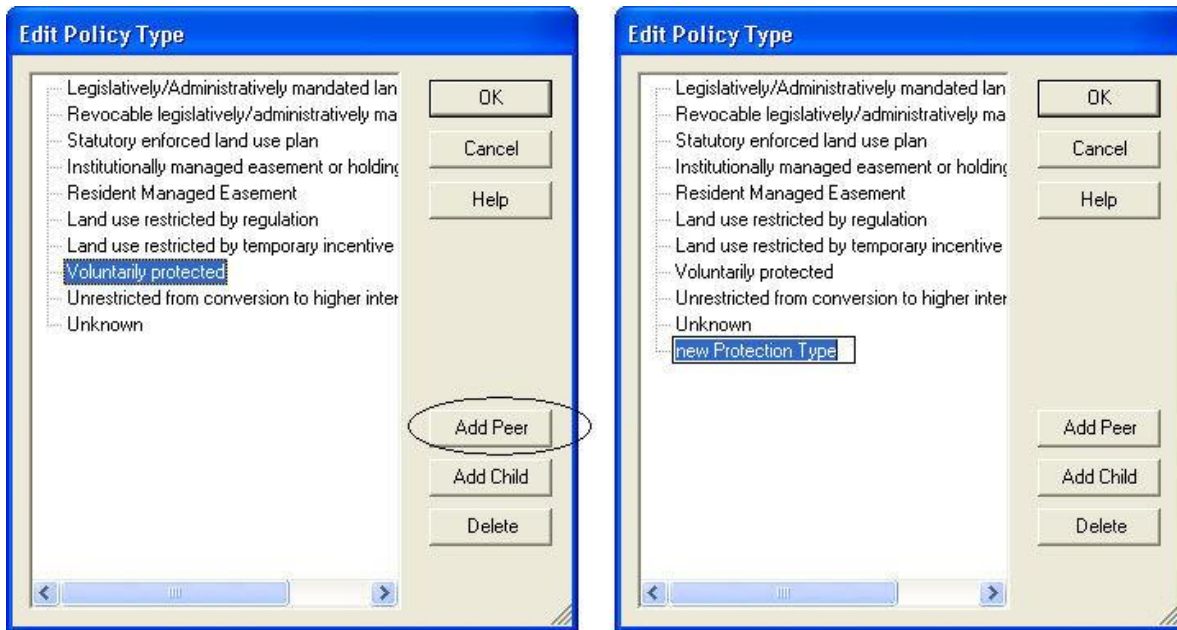
Add Child adds a new PT within, or under, the hierarchical level of the selected type. The new PT will appear as a new entry at the end of any existing child types beneath the selected PT, and can then be labeled as desired. In the following example, selecting the PT "Voluntarily protected" and clicking the **Add Child** button will result in a new child PT within/under that selected type.
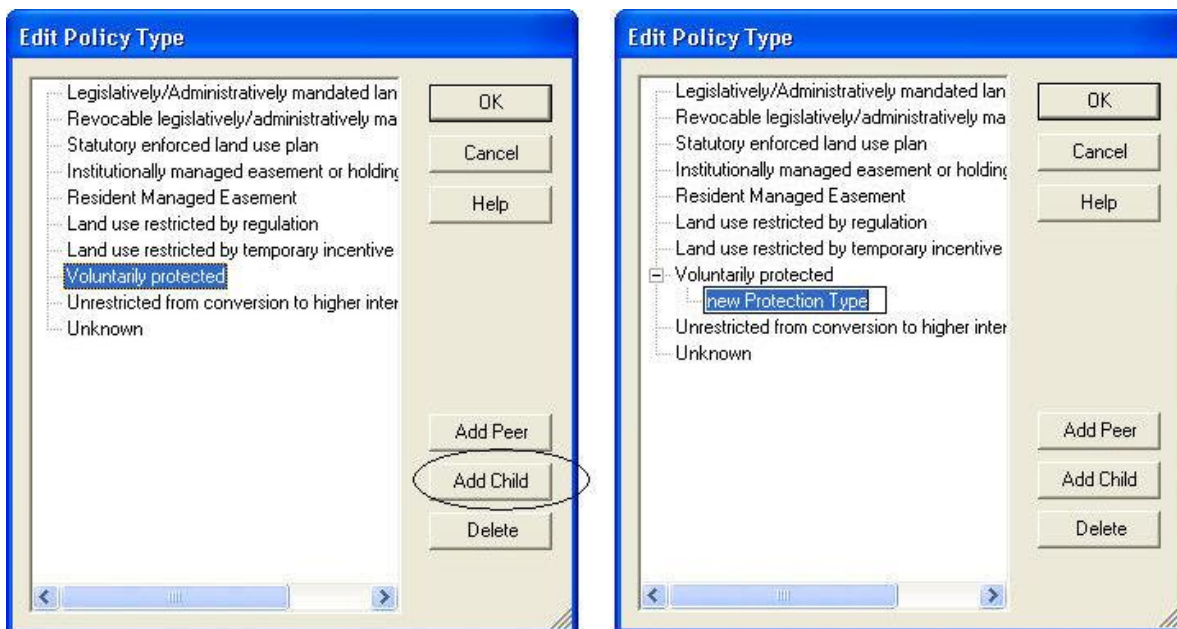
Delete deletes the PT selected.

A **Confirm Delete** window is displayed before the deletion is implemented. In cases when the PT selected for deletion contains child types, the **Confirm**

Delete window informs the user so that inadvertent deletion of these subtypes can be avoided.

A **Cannot Delete** window is displayed in cases when the PT is referenced by one or more items, as shown in the following example.

TRANSLATOR LIST WINDOW

The **Translator List** window is displayed by selecting **Lists ▸Translator List** from the NatureServe Vista menu. This window lists all the translators that have been created for land use and protection layers in the project, which are used for Scenario Evaluations.
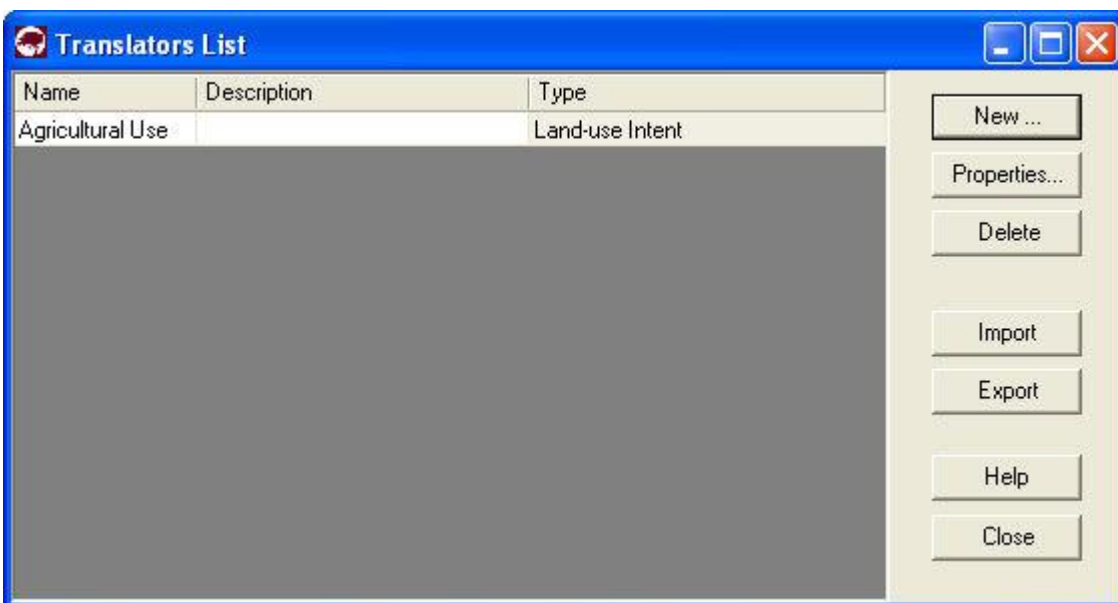
Button functions:

New... displays a new Translator Properties window that can be used to develop a new translator for a land use or protection layer to be imported into the project.

Properties... displays the Translator Properties window showing details and allowing edits to the translator selected in the list.

Delete deletes the translator selected in the list.

A **Confirm Delete** window is displayed before the deletion is implemented.

A **Cannot Delete** window is displayed in cases when the translator is referenced by another item used in scenario evaluations, as shown in the following example.
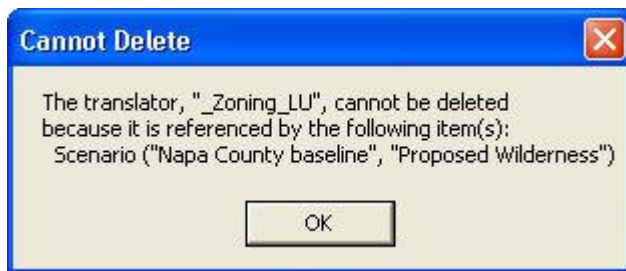
Import... opens a browse window to locate a translator (developed in another project) to be imported into this project.

Export... opens a browse window to find the desired location to place a copy of the selected translator so that it can be imported into another project.

Help opens the on-line documentation.

Close closes the window.

Columns displayed:

Name - name of the translator.

Description - description of the translator, if any.

Type - type of translator, Land-use Intent or Policy Type.

TRANSLATOR PROPERTIES WINDOW

The **Translator Properties - <New>** wizard is displayed by clicking the **New...** button on the Translator List window. The new properties wizard is used to create a translator used to translate land use/management or policy practices layer into land status types, specifically land use intent (LUI) categories or policy types (PTs) utilized by Vista in Land Use and Conservation Scenario Evaluations. See the Creating Translators section for more detailed information on the development and use of translators for importing scenarios. For detailed descriptions of Vista land use statuses, see Appendix F for LUI categories, and

Appendix G for PT. The Translator Properties wizard consists of a series of screens for recording specific information that defines the new translator.


Note that at any time during the process of creating a new translator, the previous step in the process can be revisited (and data changed, if desired) by clicking the **<Back** button, or the action can be canceled altogether by clicking the **Cancel** button.

<u>Create a translator</u>:

1. Specify a name for the new translator in the **Translator Name** field. The **<New>** on the window title will change to the name of the new translator as the entry is typed in.

2. Enter a brief description of the translator in the **Translator Description** field, if desired.

3. Indicate whether the translator will assign land use or policy types using the appropriate **Land Use** (the default) or **Policy Type** radio button. Click **Next>**.

4. Indicate, using the appropriate radio button, whether the translator will 1) assign a **single Vista land status** (i.e., LUI or PT) for the entire group of land use categories or policy types in that layer (the default), or 2) assign an individual Vista type for each of the different land use categories or policy types (i.e., **translate all features based on attribute values**). Generally, option 1 is most useful for single purpose layers (such as a stream setback regulation), while option 2 is useful for general land use and zoning layers that have different land uses and perhaps policies for specific areas/zones within the layer.

5. If the **Translate all features to a single land status** radio button was chosen, select the appropriate land status type to be used for all features. The most sensitive elements should be used to determine the single value to be assigned for this option. However, this has the effect of reducing the precision of the compatibility assessment for less-sensitive elements. Element-specific response requires greater information but increases the precision of the analysis and flexibility for the client to meet element conservation goals in a variety of land use types. Click **Next>**, and then **Finish** to complete the new translator. Disregard the remaining steps in the process.

6. If the **Translate features based on attribute values** radio button was chosen, click **Next>**.

7. Select the layer to be used for developing the translator from the drop-down list in the **Build translator based on layer** field, or by using the ArcCatalog button. Values in the drop-down list are determined by what is in the Table of Contents (TOC), or a subset thereof (by layer type). If the ArcCatalog button is used, a Select Polygon Input window is

displayed; browse to the appropriate layer, select, and click the **Add** button.
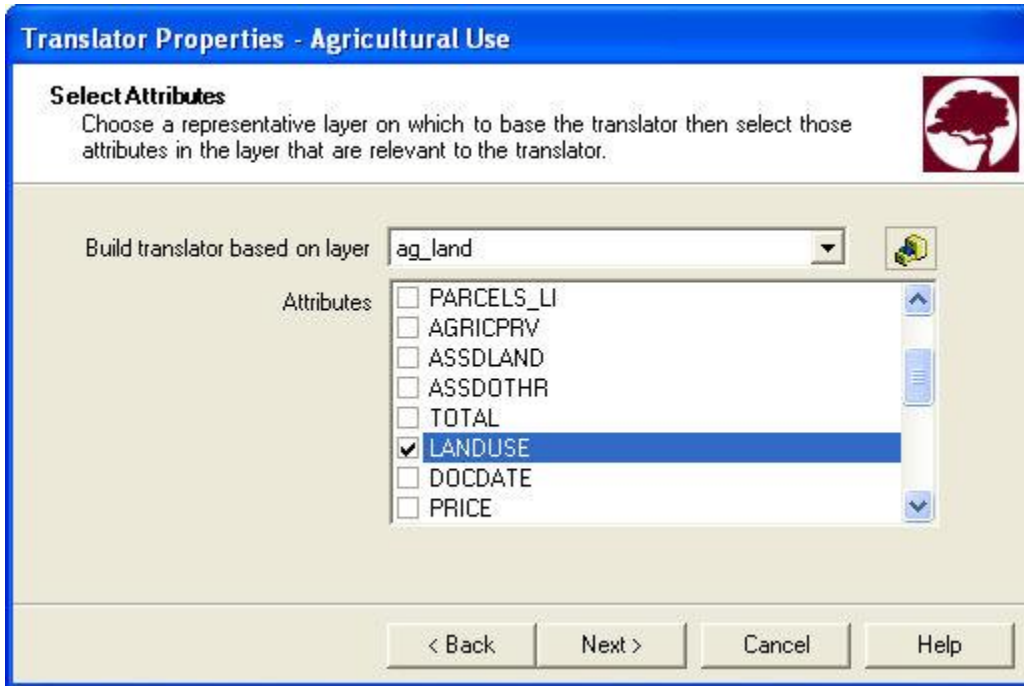
8. A list of attributes for features in the selected layer is displayed in the **Attributes** box. Indicate the feature attribute(s) to be used to create the translator, i.e., those that are most relevant to land use/management or policy practices, by placing a check in checkbox next to the attribute(s). Click **Next>**.
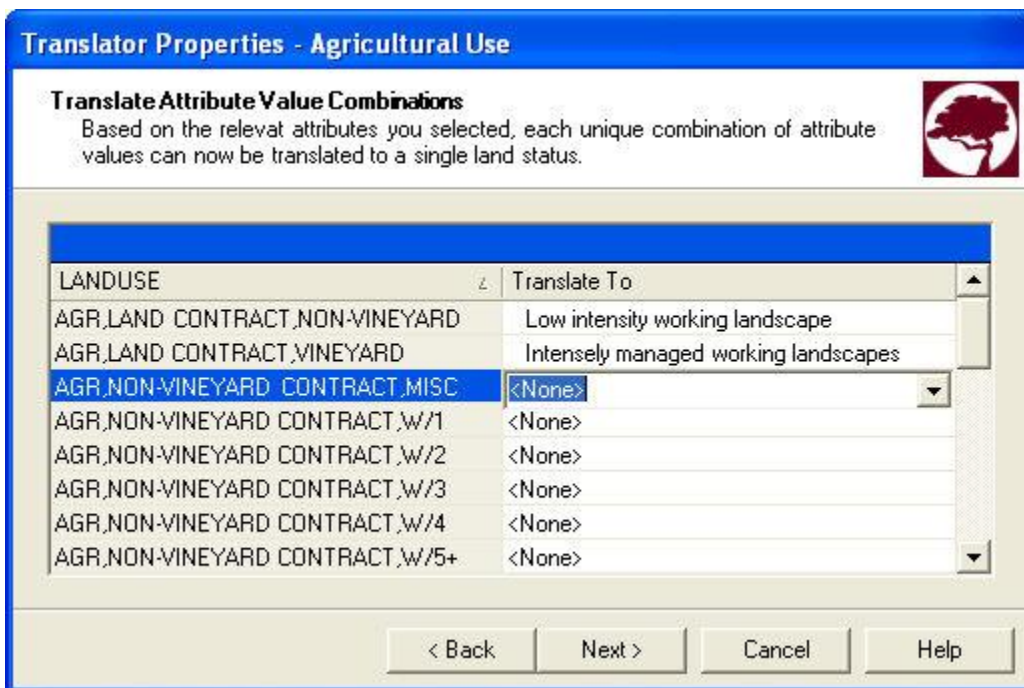
9. For each type or combination of types listed in the attribute column (in the above example, **LANDUSE**), select a single translated status from the drop-down menu provided in the **Translate To** column. Status types displayed in the drop-down menu are determined on the basis of the kind of translator indicated in step 3 above (i.e., LUI or PT), and consist of a single entry for each different type of the attribute/attribute combination selected in the previous step. Every attribute/combination must have a land status selected in order to complete the translator; land status types that are unchanged from the default <None> entry will be flagged ● as needing an assigned LUI or PT. Any specific interpretations employed for assigning a particular LUI or PT should be documented.

LUI translators: Select the Vista type that best describes the unique land use for each attribute or attribute combination. Note, however, that the selected LUI type must be from the lowest (i.e., minor category) level; selection of a major category type will be flagged ● as an invalid entry. Assigning the major category "Unknown" will result in the assumption of "incompatible" in analyses that utilize LUI compatibility information.

PT translators: Select the Vista type that identifies the appropriate policy practice for each attribute or attribute combination. The assigned PT indicates the mechanism that guides the implementation of an LUI designation, including processes that prevent or allow land uses of greater intensity. Because some of the policy types are fairly dynamic (e.g., zoning), a conservative approach should be used in assessing whether a PT category is likely to permit LUI changes. Assigning the category "Unknown" will result in the assumption of "unprotected" in analyses that utilize PT information.

Keystrokes that can be used to navigate through the list of land status types for data entry include the following:

- Clicking on an entry in the Translate To column will display a drop-down menu
- Clicking <Tab> twice will move the cursor to the next item and highlight it
- Clicking <Shift><Tab> will move the cursor to the previous item
- The down and up arrow keys can be used to move down or up, respectively, the list of types in the drop-down menu

10. Once every attribute has an assigned Vista type, click **Next>**, and then **Finish** to complete the new translator.

Note: It is important to create both a LUI translator and a PT translator that translate all features to the single value "Unknown." These will be used to translate the boundary layer for the project, which should be included in all scenarios to insure that no area within the project boundary will fall out as "unspecified" in a Scenario Evaluation.

Edit a translator:

1. Select the translator from the list on the Translator List window and click the **Properties...** button. The resulting properties wizard displays the translator.

2. Edit the translator using the processes described above for creating a new translator as guidelines.

3. To close the window and save any changes made to the translator click **OK**; otherwise, click **Cancel**.

   Note that if the translator type, that is **Land Use** or **Policy Type** (originally selected in step 3 of the creation process) is changed, the following message will be displayed:
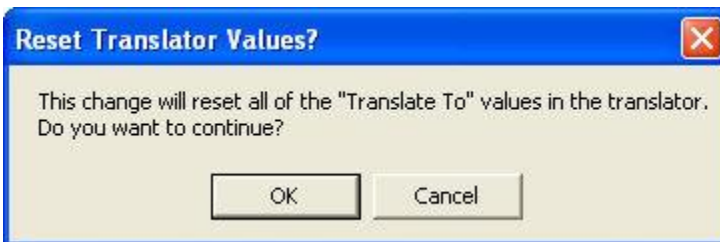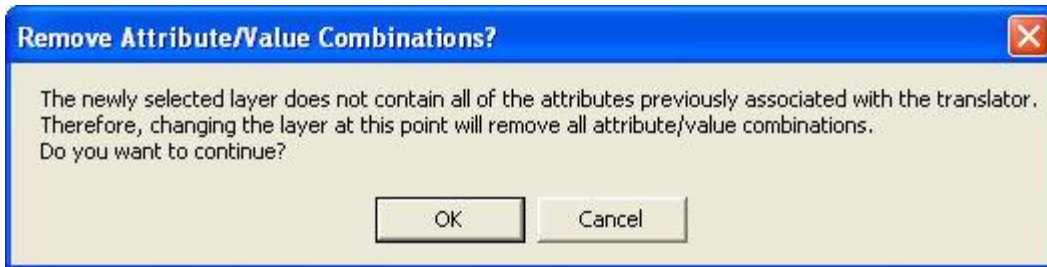

   Clicking **OK** will continue with the change, and an entirely new set of land status types will need to be selected for the attributes (as described in step 9 above); clicking **Cancel** will leave the translator type unchanged.

   Note also that if the set of attributes associated with the translator is changed, the following message will be displayed:
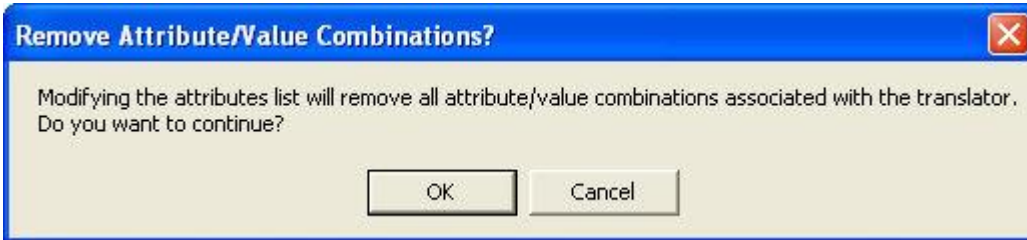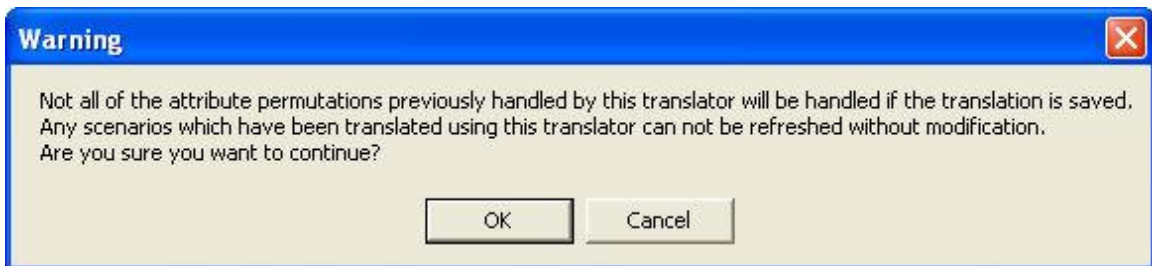

   Clicking **OK** will continue with the change, and an entirely new set of land status types will need to be selected for the attributes (as described in step 9 above); clicking **Cancel** will leave the attributes used for the translator unchanged.

   Note also that if the layer to be used for the translator, selected in the **Build translator based on layer** field (step 7, above) is edited, the following message to confirm the change may be displayed:

Clicking **OK** will continue with the edit, and an entirely new set of land status types will need to be selected for the new attributes (as described in step 9 above); clicking **Cancel** will leave the original layer, along with the status types assigned to its attributes, unchanged.

Note also that if the translator is edited such that the full set of attributes previously addressed by the translator will no longer be handled, the following message will be displayed:

Clicking **OK** will continue with the edit, and scenarios that were defined using the translator will need to be modified; clicking **Cancel** will leave the set of attributes associated with the translation unchanged.