Relevant Database-Oriented Tools for Potential Use with Multi-Ecosystem Services Tools

Summary

The purpose of this work was to lay the groundwork for interested Working Group (WG) member companies to leverage their investments in certain widely-supported and accepted database-driven tools, as ecosystem services (ES) tool developers consider potential datasets to feed into and/or interface with their tools.

The assessment includes three database-oriented tools that were financially supported by certain WG member companies and that appeared to have potential to link with broader ES tools. The three tools are:

- Conservation International's Integrated Biodiversity Assessment Tool (IBAT)
- WBCSD's Global Water Tool, and
- NatureServe's Vista.

The assessment results are set out in the tables in Attachment 1 and include a detailed description of each tool as well as an evaluation of the tool's relevance and applicability to the ES tools being reviewed by the WG. The information presented represents consolidated input from BSR, concerned WG member companies, and the developers of each of the tools.

The results of the assessment were shared with developers of the ecosystem services tools that were the focus of the October WG Roundtable with tool developers in Phoenix, Arizona through pre-event materials. Given the current state of development of the ES tools reviewed at the Roundtable, BSR and member company analysis concluded that it is currently too early to identify clear potential interface points between these ecosystem services tools and the more database-driven tools listed above and summarized in the annexes.

BSR will continue to monitor this issue and pursue conversations with relevant tool developers as and when opportunities to pursue potential tool linkages are identified.

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Attachment 1:
Summary Review of Selected Database Tools

ASSESSMENT CRITERION	IBAT
Purpose / Objective of Tool	*The IBAT Vision: Decisions affecting critical natural habitats are informed by the best scientific information and in turn decision makers support the generation and maintenance of that scientific information.* Seeks to provide to private and public section decision-makers: • Access for private and public sector decision-makers to accurate and reliable information on biodiversity and critical habitats at finest scale possible to inform a range of activities (such as planning new operations; assessment of risks associated with sourcing practices, development of national or regional development strategies, and practical implementation of environmental safeguard policies and industry best practice standards), and • Support for use of biodiversity information at earliest stages of project planning through a web-enabled decision support system that integrates and interprets the most critical biodiversity information available
Tool Developer / Partners	• *Developer:* IBAT Alliance, consisting of BirdLife International, Conservation International (CI), International Union for Conservation of Nature (IUCN) and the United Nations Environment Programme World Conservation Monitoring Centre (UNEP-WCMC). Software development is by QPQ Software Ltd. • *Corporate sponsors::* Bank of America, BP, Cargill, Chevron, JPMorganChase, supplemented by corporate partners in UNEP-WCMC's Project Proteus addressing the World Database on Protected Areas (17 companies, including BP, Chevron, eni and Shell, among others) • *Public sector partners?*
Target Audience(s)	Tool is targeted toward public and private sector organizations involved in biodiversity risk assessment. It is not targeted at specific industry sectors, although interest has been greatest from companies operating in the oil & gas and mining & minerals sectors, with more limited interest from agriculture, construction and consultancies. A major target audience is public and private organizations in the finance sector (e.g. International Finance Corporate, Equator Principles Financial Institutions, development banks).
Year of Creation / Tool Launch	Launched at the World Conservation Congress, October 2008
Scope / Applicability *ideally including illustrative questions to which the tool can be best applied*	Tool is global in scope. Primary expected tool application within companies is likely to be: • high-level corporate geographical biodiversity and protected area risk exposure assessments • location selection and site planning for new projects and operations, and • assessment of biodiversity and protected area risks associated with sourcing practices. Examples include: • Determining the location of a new development (by providing ability to scope particular regions and sites during the

early stages of decision-making process, thus facilitating narrowing of site options and identifying risks likely to require budgets for avoidance and mitigation measures)
- Supply chain management (by identifying potential issues associated with locations of sources of raw materials, thereby informing design of strategies to effectively manage biodiversity risks within a company's supply chain, such through discussions with suppliers on biodiversity conservation policies and management practices)
- Support for company biodiversity performance reporting (by allowing company to identify whether/where it is operating in/near areas of high priority for biodiversity in a region or globally

Other key anticipated uses will be by multilateral development agencies reviewing projects against biodiversity-related policies and guidelines, such as World Bank Operational Policy 4.04, International Finance Corporation's (IFC) Performance Standard 6, and the Inter-American Development Bank (IADB) Policy Directive B.9.)

Approach is to integrate and layer information about locations and characteristics of both protected and unprotected globally-identified high priority sites for biodiversity conservation (rare and endangered species, key biodiversity areas and protected areas). User can screen geographical locations of current/potential business activity against this information.

Focus is currently pitched as an early screening tool. It can help inform and prioritize subsequent data collection, assessment and planning in the project cycle, but is not intended to replace these processes

Databases Used	- IUCN Red List of rare and endangered species (managed through Species Information Service and presented at www.iucnredlist.org) - World Biodiversity Database – the management tool for Important Bird Areas and Key Biodiversity Areas, currently a joint project between BirdLife International and Conservation International - World Database on Protected Areas, managed by UNEP-WCMC in partnership with IUCN's World Commission on Protected Areas
External Input Data Required / Possible	None required. Users download results of tool application into their own systems and maps to work with further as they may desire.
How the Tool Operates	Provides the following main features: - Summary country/territory information for species, sites and protected areas, with links through to a searchable database on each, and then links through to the source external sites for more detailed information - Map tool, providing a typical set of mapping functions (pan, zoom, query, print), site fact sheets, deep-links to external web-sites providing more detailed information, intersection report, download of the source information in either .shp or .kml format - Supporting information Anticipated future enhancements include - Additional point-based intersection report - Google-type imagery for backgrounds - Mobile-device (e.g. i-phone) aware - Series of guidance videos to help with use and interpretation (possible) Guidance to other resources, such as key institutions on the ground in region/country

Geographic Coverage of Databases	Datasets are global. Tool data layers describe degree of coverage.
Database Quality & Maintenance	Intent is for IBAT data to be credible (globally recognized), trusted, accurate, current, updated over time, reliably available, relevant, easily understood by non-scientific audience. Data layers in the tool are updated periodically to reflect significant changes in the underlying data sets, and at a minimum of once per year. Tool's data layers describe degree of completeness and coverage. BirdLife data are generally high quality and well maintained. UNEP-WCMC depends on national government, supplemented by NGOs, to provide WDPA data, so that quality will vary by country. KBAs have been identified according to international conservation organization protocols, but IUCN is undertaking a broad community consultation to converge on common global standards for identification of sites of biodiversity conservation significance (e.g., key biodiversity areas)
Format of Outputs	• Spatial data can be downloaded in either .shp or .kml format • Intersection report generates a .rtf report • Print can be to screen, html or pdf
Transparency of Tool Design and Operation	Tool is highly transparent. Information about processes involved in designing and populating underlying data bases can be obtained from key organizations responsible for them (e.g. BirdLife, UNEP-WCMC).
Key Assumptions Built into Tool	IBAT tool contains no key built-in assumptions. The underlying databases accessed by the tool are based on field observations by conservation scientists (primarily in public and non-governmental organizations) and mapped to internationally recognised standards that based upon several decades of experience. However, those databases may have built-in assumptions not obvious to IBAT user.
Key Limitations of Tool (e.g. scope, scale dependence, data, etc.)	The tool is for early screening, not a replacement for a subsequent in-depth Environmental Impact Assessment or a range of other biodiversity impact identification, assessment and mitigation activities that may be needed for a specific project or activity. Ground-truthing of data likely to be necessary/desirable for local site-specific purposes. Mapping functions of the tool are fine-scale. The scale and precision of tool application in specific areas of the world are dependent on the scale and precision of data for those areas available in the underlying data bases. Widely-accepted global standards for identifying/defining key biodiversity areas have not yet been formally established under IUCN (see *Data Quality and Maintenance* above).
Ease of Use & Time / Personnel Demands for Applications	Quick and easy to use, requiring no GIS experience required or third-party applications.
Availability to Users (current/planned)	The tool is available for a subscription fee to private sector users through IBAT for Business website (http://www.ibatforbusiness.org), operated by BirdLife International on behalf of the IBAT Alliance. Subscription costs for companies are based on company's annual revenue: • Large business (annual net revenue >US$1 billion), cost is US$25,000 (excluding applicable taxes) for 12 months unrestricted access to the system

	• Medium business (annual net revenue >US$100 million and <US$1 billion), cost is US$10,000, (excluding taxes) for 12 months unrestricted access to the system • Small business (annual net revenue <US$100 million), cost is UK£350 (excluding taxes) for access for 14 consecutive days (from the date of registration), together with permission to download a single country/territory data set. There is a subscription option for individuals only for their personal (no commercial) use. It provides access to the system for 14 consecutive days (from the date of registration), together with permission to download a single country/territory data set, for a cost of UK£350 (excluding taxes). However, individual users, if they are from the not-for-profit sector, may be able to access the version of IBAT known as *IBAT for Research and Conservation Planning*.
Potential Corporate Activity/Decision Interface(s)	• Corporate strategy: High-level risk assessments for exposure to biodiversity and protected area risks in specific geographic locations • Business operations: new project planning involving identifying siting risks and options • Supply chain management: identification of potential risks associated with supplier activities in specific geographical areas associated with globally important biodiversity and/or designated protected areas
Current Corporate Sponsors? **Users?**	Corporate sponsors are those supporting IBAT development, together with those in Project Proteus through UNEP-WCMC. These are Anglo American, Bank of America, BHP Billiton, BP, Cargill, Chevron, ConocoPhilips, ENI, ExxonMobil, JP Morgan Chase, PremierOil, Repsol, Rio Tinto, Shell, Statoil, Total. It is not clear which of these companies, if any, have used the tool, as there are no case studies or company-specific application information on the website. Customized versions of IBAT have been developed for several multilateral development organization users (International Finance Corporation and Inter-American Development Bank). Again, no information on whether/how the tool has been used by those organizations is publicly available.
Existing/Potential Future Links to ES Tools	Expansion of the underlying data sets to include ES being considered. No clear potential links between this tool and any of the broader ES tools being reviewed by the BSR WG currently identified.
Who to Contact for More Information	Martin V. Sneary Programme Director Integrated Biodiversity Assessment Tool Email: martin.sneary@iucn.org US cell: 202 270 5432 c/o Conservation International, 2011 Crystal Drive, Suite 500, Arlington, VA 22202

ASSESSMENT CRITERION	NATURESERVE VISTA
Purpose / Objective of Tool	Vista is a decision-support system (consisting of both a process and software) to help users integrate conservation with land use and resource planning of all types. It is sophisticated, powerful, flexible and spatially-explicit, and applies commercial grade design and engineering. Vista covers a wider spectrum of conservation assessment and planning than any other single tool that NatureServe is aware of, but also is designed to be implemented in toolkits with other tools to provide complete assessment and planning solutions. Its core strengths are cumulative effects assessment and mitigation planning.
Tool Developer / Partners	• *Developer*: NatureServe (a non-profit conservation organization whose mission is to provide the scientific basis for effective conservation action), headquartered in Arlington, Virginia, USA. NatureServe represents an international network of biological inventories known as natural heritage programs or conservation data centers, operating in all 50 U.S. states, Canada, Latin America and the Caribbean, with a strong focus on information about rare and endangered species and threatened ecosystems • *Primary partners in tool development*: NatureServe has been advised by many academic, commercial, and non-profit organizations in Vista's development but it has been built completely in-house. • *Primary funders for development/endowment*: Doris Duke Charitable Foundation; U.S. National Aeronautical and Space Administration (NASA); the SURDNA Foundation; Packard Foundation; Chevron; Environmental Defense Fund; Georgia Department of Natural Resources
Target Audience(s)	Planners, resource managers, scientists, conservationists in diverse types of organizations (government agencies, companies, and others)
Year of Creation / Tool Launch	First version of tool publicly released in 2004. Current version is 2.5.1 (fourth generation of the software), launched in 2010
Scope / Applicability *ideally including illustrative questions to which the tool can be best applied*	Tool can help users conduct conservation planning and assessments; integrate conservation values with other planning and assessment activities (e.g. land use, transportation, energy, natural resource, and ecosystem-based management); evaluate, create, implement and monitor land use and resource management scenarios designed to achieve conservation goals within existing economic, social and political contexts. Tool can be used for a wide variety of projects, including comprehensive land use planning, review of development projects within context of existing plans, infrastructure planning, inventory and monitoring. Potentially of most interest to companies is its usefulness for conservation planning (core to Vista functionality). Conservation planning within the Vista methodology is the act of allocating areas of land and water to compatible land uses and reliable policies for the maintenance of conservation elements. These elements can be components of biodiversity (e.g., species, ecosystems) or items of cultural value such as scenic viewsheds, historic sites, or farms. Vista can integrate a variety of ecosystem services as "conservation elements" the same as it integrates any mapped conservation element. By integrating with hydrologic models such as has been done with NOAA's N-SPECT software, Vista can readily accommodate watershed and water quality services. Other services can be modeled in other programs such as InVEST and then imported into Vista for assessment and planning purposes.

	Tool's decision-making framework can help:
	- Manage projects through complete lifecycle, including analysis, planning, implementation and monitoring - Gather and document knowledge and values of experts and stakeholders - Assess and quantify cumulative impacts of any plan, proposed project, or modeled event (like sea level rise) - Mitigate conflicts on or off site - Create land use or resource management plans that reflect user's unique situation and values - Improve efficiency of user's planning process - Enhance consistency and repeatability of planning efforts - Improve communications and build consensus with interested parties - Develop documentation and visualizations that support user's land use or resource management decisions Illustrative questions for which a company might want to use the tool: 1. What conservation elements may be affected (positive or negative) by a proposed activity and how serious is that impact? 2. How will my project act cumulatively with other impacts to affect conservation elements? 3. What sites within an area would have the least impact on conservation elements? 4. Using my land use as a conservation element, how can I assure I meet my objectives while not impeding other (conservation) objectives? 5. Where are opportunities on and offsite to mitigate project impacts? 6. How can my mitigation be designed to leverage other conservation activities to have better outcomes? 7. What is the best plan to appropriately balance an activity (e.g., timber production) and conservation values of the company's forested land holdings? 8. What are optimal approaches to avoid or minimize conflict with a population of an endangered species in a specific area in which the company is considering locating a new facility or conduct other land-disturbing activity? No ESTM WG member companies appear to have actually used Vista. However, one company's analysis of the tool from website information suggests particular potential value for companies (especially in review of surplus properties) of the following Vista features: - Conservation value analysis (especially quantification of how a property supports or detracts from the viability of a population of a listed species on the property, thus understanding potential value of the property if used for conservation vs. other activities) - Land use scenarios (especially ability to compare impacts of land use decisions on ecological features, such as wetlands and forests, as well as species) - Standardized display and reporting (especially ability to use mapping/visual component to display land use compatibility and conflict) - Automated functions and references (especially the list of typical data sources or typical data used in analysis in User Manual, which would also likely be useful to companies not using Vista) (Potentially) Conservation solution functions (especially to address issues of individual species conservation) Vista can be downloaded to run with sample data already provided by NatureServe, to facilitate user evaluation whether Vista would be useful for user's desired project.
Databases Used	Tool contains no built-in databases other than those needed to allow integration of a variety of data sets from multiple

	sources into a single conservation planning database. User identifies, collects and inputs data sets used for context-specific use of the tool. Vista relies on ArcGIS and Microsoft Access database engines and thus does not require high end enterprise database software.
External Input Data Required / Possible	Tool's database structure is designed to incorporate a variety of data from local, regional and global information sources. GIS layers form backbone of tool database. Additional non-spatial information is also required to record conservation element viability requirements such as minimum required occurrence size, overall retention goal (optional, i.e., percent or acres of current distribution), and most importantly—response of the element to the list of land uses.. Data scale and attribute detail will determine types of analyses that can be done and precision of results, so scale and quality of data provided by user need to match user's decision needs as in any GIS analyses.

Basic types of inputs will be:
• Planning regional reference information (boundary required, optional layers include streams, roads, place names, topography, digital orthophotos, etc.)
• Element distribution maps (e.g., rare and endangered species occurrences, fish and game species habitat maps, vegetation cover maps, modeled distribution maps, scenic views, historic sites, etc. including other land uses for which you'd like to meet a minimum area objective)
• Element occurrence attributes (data confidence and condition—the latter can be modeled in Vista)
• Element information (name, weight, goal, conservation unit, minimum required area, etc.)
• Scenario information (any scenario can be created and assessed, generally we recommend a current actual land use scenario and then a "future" or proposed scenario. Best analyses will result from scenarios that map all uses and features affecting elements and are typically comprised of land use (current, allowable, proposed, infrastructure (roads, transmission), public land management, and existing conservation areas.

Vista has an extensive built in User Manual that contains a list of input data required with associated specifications in order to produce described outputs. |
| **How the Tool Operates** | Operates on the ESRI desktop ArcGIS platform; supports ArcMap 9.2 and 9.3, currently being tested on 10.0. Uses Windows 2000 or Windows XP, likely compatible with 7.0.

Tool's planning focus is "conservation element", which represents features user wants to conserve in relevant area. (Conservation elements can include biodiversity – both species and ecosystems, ecosystem services, cultural features, and other land uses user wants to represent at specified level.

The tool installs as an extension to ArcMap with its own menu tab and project management tab but otherwise is fully open to all other ArcGIS functions. While the tool does not enforce a rigid workflow, there are basic first steps required to 1) set up the project with a boundary, and 2) establish a list of conservation elements and their requirements.

From there a variety of analyses can be conducted including:
• Combine any group of elements and their characteristics to create "conservation value summaries" that for example can answer questions such as "where are concentrations of legally-protected elements,""where are areas relatively free of conservation values,""where are the areas of highest/lowest habitat condition"
• Examine any site to understand the inventory of elements and land uses at that location and how the site is performing in terms of supporting or impacting elements and what land uses are responsible. |

- Importing maps to define a current or any alternative future scenario and understand the proportional mix of land uses and policies in a region
- Evaluate any scenario against any group of elements to understand how it performs overall in supporting element retention goals, quantify amount and location of impact, visualize conflict hotspots, and visualize portions of element distributions likely to be lost.
- Identify locations (using a companion NatureServe tool) offsite that can mitigate for impacts
- Create site mitigations or entire new plans by specifying changes to land use or policy for sites or collections of sites.
- Models can also include water pollution as modeled by NOAA's Nonpoint Source Pollution and Erosion Comparison Tool (N-SPECT) (interoperable with Vista, and most accurate for medium-to-large watersheds with moderate topographic relief)
- Generate conservation solutions (facilitated by Vista use of two tools – MARXAN1 and SPOT – commonly used by conservation experts around the world)
- Create maps and reports for scenarios, sites, conservation value summaries, and scenario evaluations ready for HTML.

Tool also designed and demonstrated to work with a number of other planning and modeling tools, such as CommunityViz (for land use planning) .

Geographic Coverage of Databases	Determined by databases user brings into the tool. (NatureServe's network of member programs can be a very useful source of information about rare and endangered species and threatened ecosystems. Quality and comprehensiveness of these data are very strong for all of North America. Geographic coverage is much less comprehensive, but being improved, for Latin America and Caribbean.)
Database Quality & Maintenance	Dependent on quality and maintenance of databases user brings into the tool. NatureServe can be used as a database management tool to constantly update information based on new maps or field inventory.
Format of Outputs	All map outputs are standard ArcGIS Grid files. Report outputs are HTML with embedded maps for all elements and analyses. Reports can be easily published online and can be exported to software programs such as Microsoft Word or Excel.
Transparency of Tool Design and Operation	Vista's data models and analyses are straightforward and completely documented in the user manual. Operation by users with basic GIS experience is fairly simple. Technical support and training programs are offered for a fee. Tool's capability to generate maps and reports enables user to thoroughly document each input step in the planning and decision-making process (including reference citations, assumption, and logic of each decision), This is intended to deliver transparency in the process and use of the tool, as well as to support communication of process and outputs to others
Key Assumptions Built into Tool	Analytical assumptions are created and documented by the user (e.g., this element has a negative response to this land use), this minimum occurrence size and goal are required for element viability).
Key Limitations of Tool (e.g. scope, scale dependence, data, etc.)	Tool is designed to operate at multiple scales - from small local to larger regional applications. Scalability will depend on whether user has sufficiently precise data to support desired analytical scale.

	Some ESTM WG companies that have looked at, but decided not to use, Vista did so in part because the tool was more complex and powerful than needed for the type and scale of the company activity/small size of land area being analyzed. Vista can be downloaded to run with sample data already provided by NatureServe, to facilitate user evaluation whether Vista would be useful for user's desired project.
	Tool is appropriate for projects where ArcView (rather than ArcInfo) will meet computational needs for the project. It cannot process combination of layers that exceed 1 billion pixels, and requires tradeoffs for planning areas exceeding 1 million hectares (2.2 million acres) such as reducing pixel resolution of outputs. Vista has been used successfully for areas as large as 6 million acres at fine spatial resolution.
	Data limitations are dependent on question (both content and precision) user needs answered. Free global data exists to make use of the tool practical anywhere for simpler coarse scale results.
	Tool does not cover all processes of conservation planning; therefore some evaluations must be conducted using other tools, custom GIS analyses, and professional opinion. For example Vista does not incorporate species demographic information and analyses, so post-processing Vista results with a population viability analyses tool is recommended when those questions are important. Vista also has limitations in analyzing fragmentation, so post-processing with a fragmentation tool (e.g., HPP, fragstats) would be useful when fragmentation is a key concern.
	Vista User Manual identifies limitations relating to data input and a number of other topics.
Ease of Use & Time/Personnel Demands for Applications	Vista was designed to support assessment and planning work by computer literate but otherwise lay users with support by GIS and subject matter experts for portions of the process. It has very high end graphical users interfaces integrated with the help manual supported by technical support and training services.
	Tool provides utilities to facilitate collecting information, inputting and documenting data, and conducting thorough data validation functions that run in the background
	The amount of data needed is dependent on questions user wants to answer and level of precision required. Actual processing time for individual analyses will also vary, depending on complexity of problem user attempting to address, precision of data sets, and overall size of the planning area.
	The most time consuming steps in the planning process will be priority setting (e.g. what questions does user hope to address using Vista and what data are required to answer them), and (similar to most projects using GIS tools) collecting the data and inputting into the tool. The most time demanding aspect is obtaining the element subject matter expert input (minimum required occurrence size, element response to land uses, retention goal, etc.).
	Skills/expertise needed to apply the tool will depend on analyses to be performed. Those likely to be needed to effectively implement full range of tool functions will include project coordination & management, GIS, data management, metadata documentation, ecology, zoology, and non-biological domain expertise, such as farmland conservation or archaeological sites).
	Vista website (http://www.natureserve.org/prodServices/vista.jsp) contains a significant amount of information to explain the tool and support users. Key features of tool included guided data entry, GIS automation, wizards to walk user through specific analytical steps, and easy installation, registration and integrated on-line help. NatureServe can

	provide a variety of technical support, training and consulting services as described on the tool website.
Availability to Users (current/planned)	Anyone can download the tool for free. NatureServe has an endowment for Vista and plans to support and evolve Vista indefinitely.

No new major releases are currently under development. However, NatureServe will continue to address priority improvements as resources allow with version 2.5.2 with incremental improvements expected before end of 2010.

NatureServe also has an extensive list of desired improvements and software expansions to increase performance for large regions and assist usability through online collaborative information sharing. Significant opportunities exist for added functionality, primarily by building on NatureServe's approach of building interoperating tool kits (such as companion tool to support offsite mitigation planning, and tools in ecosystem services and return on investment analyses). NatureServe continues to encourage partnerships with resources to improve and expand the tool. |
| **Potential Corporate Activity/Decision Interface(s)** | • Corporate Strategy: Rationalization of company's land-holding portfolio for purposes of identifying conservation/development value tradeoffs
• Consideration of conservation values in Business Operations:
  o New projects – evaluation of facility and siting options, assessment of potential activity impacts and mitigation approaches
  o Ongoing Site Management and Asset Retirement planning for optimal conservation/development value |
| **Current Corporate Sponsors?**
Users? | No current corporate sponsors. (Chevron provided funding for an earlier version of Vista, and Centex (now part of Pulte Homes) provided ¼ of the endowment). ExxonMobil has provided funding to NatureServe, although not specifically for Vista.

Corporate users have included Potlach Corp. (to analyze company's forest land tracts in south-central Arkansas), and consulting firms. NatureServe is not aware of any publicly-available case studies of corporate uses of Vista other than the Potlach Corp. case study on the NatureServe website. However, since Vista is a free download, NatureServe is only familiar with a small number of applications of the several hundred registered users. NatureServe staff are not aware of any ESTM WG company using Vista.

Chevron and ExxonMobil have both looked at Vista for possible company use. Chevron sees significant potential value in the tool in concept, but has not to date identified a clear business need to use it. ExxonMobil also sees significant potential value in the Vista for evaluating surplus properties, but relevant staff did not have access to current versions of internal software needed to run the tool. |
| **Existing/Potential Future Links to ES Tools** | **InVEST:** According to NatureServe staff, NatureServe and the Natural Capital Project had a few conversations about the potential for using Vista with InVEST and walked through a theoretical integration of the tools that was then partially tested in a project in Colombia. The test successfully showed that Vista's capabilities for scenario characterization could feed current and future land use scenario information into InVEST (which InVEST needs but can't produce itself). InVEST then can model ecosystem services distributions and values from those scenarios.
Also discussed, but not tested, was the import of the InVEST ecosystem services information back into Vista, to be combined and assessed with a large diversity of other conservation and recreation values that Vista can provide. Vista could then provide information back on impacts to ecosystem services and, most importantly, is able to create a plan in |

	Vista to restore or conserve ecosystem services (which InVEST can't do directly).
	Vista creates its own biodiversity-ecosystem service layer and has successfully imported a more limited set of data, such as watershed integrity and water quality. However, InVEST provides economic quantification (something that can't be measured in Vista) for a much broader set of ecosystem services. So the two organizations feel the tools appear to be highly complementary. However, NatureServe and NCP have no current plan to explore formal linkage of the two tools though the value of such has been discussed.
	Other ES tools: NatureServe staff have not looked at potential complementarities with any of the other ecosystem services tools being reviewed by the ESTM WG. However, the fairly basic and open Vista data model was designed to facilitate integration with a large number of tools. So NatureServe staff feel the potential complementarities with other ES tools may be significant.
Who to Contact for More Information	Patrick Crist, Director, Conservation Planning and Ecology (Patrick_Crist@ Natureserve.org; telephone +1-703-797-4810)

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ASSESSMENT CRITERION	WBCSD GLOBAL WATER TOOL
Purpose / Objective of Tool	Tool helps companies and organizations map their water use and assess risks relative to their global operations and supply chains
Tool Developer / Partners	• Developed by World Business Council for Sustainable Development, with company member CH2M Hill as a project leader and tool developer and stewardship by WBCSD's Water Working Group. • Advisory board of 22 WBCSD member companies in wide range of industries (including DuPont and Shell), provided oversight and pilot testing (full list of companies is below). • "Expertise" (undefined on WBCSD website) provided by Global Reporting Initiative (GRI) and The Nature Conservancy in terms of GRI approval the way the tool generated its water-related indicators and TNC assistance in ensuring the best water datasets included in the tool
Target Audience(s)	Companies and any other organizations who need to better understand the water issues in their operations and that of their extended supply chain
Year of Creation / Tool Launch	Launched in 2007, updated in 2009 and 2010
Scope / Applicability *ideally including illustrative questions to which the tool can be best applied*	Tool is global in scope. WBCSD has identified potential benefits of tool as including: • Ability to compare company's water uses (including staff presence, industrial use, and supply chain) with key external water-related data • Calculation of water consumption and efficiency • Creation of key water GRI Indicators, inventories, risk performance metrics and geographic mapping • Identification of relative water risks in the company's portfolio to prioritize action • Support for effective communication with internal and external stakeholders on the company's water issues Illustrative questions for tool application: • How many of the company's sites are in extremely water-scarce areas? Which sites are at greatest risk? How will that look in the future? • How many of the company's employees live in countries that lack access to improved water and sanitation? • How many of the company's suppliers are in water scarce areas now? How many will be in 2025?
Databases Used	• AQUASTAT from UN Food and Agriculture Organization (FAO) • Data from World Health Organization (WHO) and UNICEF Joint Monitoring Program (JMP), World Resources Institute (WRI), University of New Hampshire in USA, International Water Management Institute (IWMI) and UNDESA Population Division.
External Input Data Required / Possible	2 options available: • Data required are the lat./long. coordinates of sites and/or suppliers. Inputting this geographical information is easy and can already produce useful outcome including charts and maps. • Data required is site specific water use information (withdrawals and discharges per source, how much is

	recycled/reused, productions/sales for water intensity metrics).

How the Tool Operates	Tool is comprised of:
	• an Excel workbook for inventory, calculation of key water GRI Indicators, external data connection, and metrics calculations
	    o All company data inputs are on a single sheet
	• Online mapping (accessible from the Excel workbook) based on inventory of company site locations
	    o Includes mapping of site locations (including supplier sites if desired) with external water and sanitation datasets and external water maps) and Google Earth interface for spatial viewing (including one-click ability to view all sites on Google Earth)
	
	Map datasets are provided for key country and watershed metrics (e.g. annual renewable water resource per capita, mean annual relative water stress index, and access to improved water sanitation).
	
	Company data is kept secure by user, not saved on WBCSD website.

Geographic Coverage of Databases	Databases ostensibly have global coverage. Neither WBCSD website nor the tool itself appears to provide detailed information about the precise scope and coverage (including gaps and limitations) of individual databases. Definitions and sources of all external datasets included in the tool itself.
Database Quality & Maintenance	WBCSD website states only that datasets are available in the public domain, are "considered valid by the global community of water stakeholders", are "recent" and "will be updated". Neither the website nor the tool itself appears to provide any other information on database quality and maintenance. WBCSD is committed to update the tool as updated datasets become available. This has happened twice already, in March 2009 and September 2010.
Format of Outputs	Automatic outputs include GRI water indicators and downloadable metrics charts with combined company, country and watershed data
Transparency of Tool Design and Operation	Tool design and use are transparent.
Key Assumptions Built into Tool	Tool assumes site-level water-related risk is based only on physical availability of water. The background datasets also include some demographic, economic and social information aiming to capture a better idea of the pressures exercised on the resource at the local level.
Key Limitations of Tool (e.g. scope, scale dependence, data, etc.)	Tool does not provide specific guidance on local situations, which require more in-depth systematic analysis. WBCSD's website does not provide any other statements regarding tool limitations. Tool does not provide guidance on ecosystem services related to water such as water provisioning. No data input fields related to upstream land use patterns, infrastructure development, type of land cover, amount of human settlement, etc. Accuracy and completeness of tool results is partially dependent on accuracy and completeness of underlying datasets. Neither website nor the tool appears to clearly identify key data limitations, so those lack transparency for tool user.
Ease of Use &	Tool easy to use. Time and personnel demands for applications will depend on type and scale of use by the company.

Time / Personnel Demands for Applications	Data fields include site locations (via specific address or latitude/longitude coordinates), water withdrawal from freshwater, groundwater sources, freshwater discharge by receiving body, non-freshwater discharge by receiving body, recycling/reused, water intensity (production/sales number of units and type), and number of site workers. Materials explaining the tool and demonstrating its operation are located on WBCSD website. Beyond those materials, and periodic updates to the tool, WBCSD does not provide support for implementation of the tool.
Availability to Users (current/planned)	Tool is free and easily downloaded from WBCSD website.
Potential Corporate Activity/Decision Interface(s)	Corporate strategy: Assessment of operational and reputational risks to company and its activities associated with water scarcity and use for one or more company site locations (including comparisons among multiple sites) Business operations: Assessment of actual and potential site risks for new projects and ongoing operations Supply chain: Assessment of water-related risks associated with supplier activity locations
Current Corporate Sponsors? **Users?**	Advisory Board: Air Product and Chemicals, Alcan, Alcoa, AngloAmerican, Borealis, Conoco Philips, Degussa, Dow Chemical Company, DuPont, GrupoNueva, Holcim, ITT Corporation, Kimberly Clark, Lafarge, PepsiCo, Suncor Energy, Rio Tinto, Sanyo, Shell, Suez, Syngenta, Unilever WBCSD unable to determine actual users as the tool is freely dowloadable from the WBCSD website. But we estimate that more than 300 companies have used the tool.
Existing/Potential Future Links to ES Tools	No clear potential links between this tool and any of the broader ES tools being reviewed by the BSR WG currently identified.
Who to Contact for More Information	WBCSD: James Griffiths (griffiths@wbcsd.org; +41 (22) 839-3114); Anne-Leonore Boffi (boffi@wbcsd.org; +41 (22) 839-3193) at WBCSD Head Office, 4, chemin de Conches, 1231 Conches-Geneva, Switzerland