

SUPPORTING MATERIALS

SM.1: SUPPORTING MATERIAL ON DEFINITIONS OF DEGRADATION AND DEVEGETATION.

This Document lists various published definitions used for degradation, devegetation and related terms, antonyms, parallelism for complete accounting, and additional terms needing defining and recommended definitions.

SM1.1 Published definitions relating to degradation and devegetation.

Table 1 lists related forest degradation/devegetation definitions that we have found through web searches and email contacts. We also include definitions of “desertification” which would be the worse case scenario of forest degradation.

Some definitions specify that the degradation has to be human-induced and some specify that there have to be a loss of productivity (indicated by “Y” for “yes,” “N” for “not specified” and “C” for “could be” in Table 1)¹.

While we are sure the list is by no means complete, it does give a good view of the range of the types of degradation one could encounter in a forest setting and some of the concepts that exists².

Table 1 – Listing of published definitions of degraded forest, devegetation, desertification, and related terms (as of 9 December 2002)				
Definition	Source	Human-induced	Productivity Loss	Notes
Degrade - Characterized by degeneration of structure or function	http://www.m-w.com/dictionary	N	N	Dictionary type definition
Degrade – Make worthless	http://dictionary.cambridge.org/cmd_search.asp?dict=B&searchword=degradation			Thesaurus. In forestry, very few areas would be considered worthless no matter how badly they are degraded.
Degrade – Spoil.	http://dictionary.cambridge.org/cmd_search.asp?dict=B&searchw			Thesaurus

¹ For definitions of deforestation, see <http://home.att.net/~gklund/DEFpaper.htm>

² See also “What is land degradation” - www.unu.edu/env/plec/l-degrade/D-Ch_2.pdf

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Definition	Source	Human-induced	Productivity Loss	Notes
	ord=degradation			
Degrade - To degenerate; to pass from a higher to a lower type of structure; as, a family of plants or animals degrades through this or that genus or group of genera	http://www.mso.anu.edu.au/~ralph/OPTED/v003/wb1913_d.html			Dictionary type definition
Degrade – To reduce; to decompose by stages; to wear away by erosion	http://www.bridgingthetwatershed.org/glossary.html#d	N	C	Dictionary type definition
Degrade - To wear by erosion or weathering.	http://www.sitesalive.com/admin/glossary/sectD.html	N	C	Dictionary type definition
Degrade -To wear down, reduce to lower quality, by erosion or reduce the complexity of a chemical compound.	http://www.epa.gov/gtrlakes/seahome/housewaste/src/glossary1.htm#degradation	N	N	Dictionary type definition
Degrade (Degradation) - Opposite of aggrade (aggradation) - to erode or deepen a river channel.	http://buttecreekwatershed.org/ecr/new/glossary.htm	N	C	Antonym
Degradation - A decline to a lower condition, quality, or level.	http://www.dictionary.com/cgi-bin/dict.pl?term=degradation		C	Dictionary type definition
Degradation - A decrease in value for a designated use.	http://www.tpwd.state.tx.us/texaswater/river/glossaryleft.htm		C	Dictionary type definition. Note emphasis on value.
Degradation - A worsening of quality or condition.	http://www.sitesalive.com/admin/glossary/sectD.html	C	C	Dictionary type definition
Degradation - Changing to a lower state (a less respected state).	http://lookwayup.com/lwu.exe/lwu/d?s=f&w=degradation		C	Dictionary type definition
Degradation - Diminution or reduction of strength, efficacy, or value; degeneration; deterioration.	http://www.mso.anu.edu.au/~ralph/OPTED/v003/wb1913_d.html		C	Dictionary type definition
Degradation -The act or process	WWWebster	N	N	Dictionary type

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of degrading (lowering to an inferior level)	Dictionary			definition
Degradation - The process by which something is made worse, esp. the quality of land	http://dictionary.cambridge.org/define.asp?key=degradation*1+0		C	Dictionary type definition. Note emphasis on land quality
Degradation - The process of degeneration.	http://www.gn.apc.org/LivingEarth/RainforestDB/glossary.a-e.html#climax_forest	N	N	Dictionary type definition
Degradation - The reduction in grade, quality, yield, etc.	http://www.forestry.toronto.ca/ac_staff/emeritus/My%20Webs/english.htm	N	C	Dictionary type definition
Degradation - To spoil or destroy the beauty or quality of	http://dictionary.cambridge.org/define.asp?key=degrade*2+0	C		Dictionary type definition
Degradation (Biological) - A type of soil degradation consisting of the mineralization of humus and an increase in the activity of micro-organisms responsible for organic decay, resulting in an overall decrease in organic matter.	http://www.unu.edu/env/plec/l-degrade/index-toc.html	N	N	Focuses on micro-organisms.
Degradation (Biological) - The diminution of biological productivity or diversity.	(Sargent and Lowcock 1991)	N	C	
Degradation (Chemical) - A number of types of soil degradation that may involve one or more of the following processes: leaching of nutritive elements; acidification; toxicities, other than excess of salts.	http://www.unu.edu/env/plec/l-degrade/index-toc.html	N	C	
Degradation (Ecosystem) - Any process or activity that removes or lessens the viability of	Dunster & Dunster 1996	N	C	

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ecosystem functions and processes, and hence biodiversity				
Degradation (Ecosystem) - Processes or activities that weaken an ecosystem, adversely affecting biological diversity.	http://www.nature.nps.gov/nrbib/HTML%20files/32.htm#3152	N	N	High grading and removing certain species can affect biological diversity, but the carbon productivity may not be affected.
Degradation (Environment) - The process by which the environment is progressively contaminated, overexploited and destroyed.	http://oaspub.epa.gov/trs/trs_proc_qry.alpha/bet?p_term_nm=D	Y	C	
Degradation (Environmental) - Exhaustion or destruction of a potentially renewable resource such as air, water, forest, or wildlife by consuming it at a rate faster than it is naturally renewed. If such use continues, the resource can become nonrenewable or nonexistent on a human time scale. Also see sustainable yield.	http://www.geog.ouc.bc.ca/conted/onlinecourses/enviroglos/e.html	N	N	Note, by this definition, human intervention to restore the environment is not considered.
Degradation (Forest - Semi-natural) - A subset of semi-natural forests with some of the principle characteristics and key components of native ecosystems; a return to a semi-natural forest is unlikely to occur in a reasonable amount of time (i.e., decades) without human intervention.	http://www.fscus.org/html/about_fsc/who_we_are/glossary_of_terms.html#d	N	N	Human intervention is required for restoration.
Degradation (Forest) - A reduction of the canopy cover or stocking within the forest. Explanatory note: For the purpose of having a harmonized	FAO 2000	N	N	Taken literally, the removal of one tree could be considered degradation since the canopy cover and

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set of forest and forest change definitions, that also is measurable with conventional techniques, forest degradation is assumed to be indicated by the reduction of canopy cover and/or stocking of the forest through logging, fire, windfelling or other events, provided that the canopy cover stays above 10% (cf. definition of forest).				stocking are reduced. Reductions in canopy and stocking are easily measured.
Degradation (Forest) - Biological, chemical or physical processes which result in the loss of the productive potential of natural resources in areas covered by forests and/or used by agriculture. Degradation may be permanent, although some forest areas may recover naturally or with human assistance	http://europa.eu.int/comm/dg08/forests/en/en4_6.htm and http://yahwood.com/glossary_uk.htm	N	Y	Human recovery is acceptable.
Degradation (Forest) - Change of forest class (from closed to open forest) which negatively affects the stand or site and lowers production capacity. Degradation is not reflected in the estimates of deforestation	http://europa.eu.int/comm/dg08/forests/en/en4_6.htm	N	Y	Generally this is reducing the overstory to less than 40%. Removing part of the overstory will temporarily reduce what the land is producing.
Degradation (Forest) - Changes within the forest class which negatively affect the stand or site and, in particular, lower the production capacity. Thus degradation is not reflected in the estimates of deforestation.	http://faov02.fao.org:70/0gopher_root%3a[fao.fra]def_uk.txt	N	Y	Essentially the same as above, but slightly different wording.
Degradation (Forest) - Changes within the forest class, for example, from closed to open	FAO 1997	N	Y	Same as above.

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Definition	Source	Human-induced	Productivity Loss	Notes
forest, which negatively affect the stand or site and, in particular, lower the production capacity. These lands are considered apart from deforestation.				
Degradation (Forest) - Generally defined as a reduction in tree density and/or increased disturbance to the forest that results in the loss of forest products and forest-derived ecological services.	http://www.wri.org/pdf/indoforest_glossary.pdf	N	C	Removal of trees may temporarily reduce the products available from the forest.
Degradation (Forest) - Temporary or permanent reduction in the density, structure, species composition or productivity of vegetation cover	Grainger 1996	N	C	This definition includes the word “or” so there are a variety of situations that may be considered “degradation.”
Degradation (Forest) - The degradation of forest environments, through processes such as destructive logging, burning, or invasion of disturbed habitats by weedy or less useful exotic species.	http://www.spcforests.org/Library/usestatus/usestatus.htm	C	N	Species invasion may be natural or human-induced. Some species invasion may increase carbon sequestration such as the invasion of <i>Melaleuca</i> in Florida.
Degradation (Forest) - The degradation or impoverishment of forests, measured in terms of loss of biodiversity (which includes genetic, species and ecosystem diversity) and economic, cultural and ecological utility and stability, resulting from the selective removal of trees or other forest plant and animal species ...	http://www.spcforests.org/Library/usestatus/usestatus.htm	N	C	Here the emphasis is on biodiversity that may or may not affect ability to store carbon. Selective removal of plants may be done naturally as well as by humans.
Degradation (Forest) - The	http://www.usask.ca/a	Y	C	Taken literally, the

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ecologically deleterious depletion by human activity of standing woody biomass and organic matter in forests, often associated with over-utilization of the forest for fuel or timber.	griculture/caedac/dbases/glossary.htm , http://www.climate-services.com/glossary.htm , http://www.undp.org/seed/forest/pdf/InnovatForesFinanc.pdf , and http://www.teleport.com/~taa/glossary.htm			woody biomass and organic material has to be affected. No mention is made of the soil.
Degradation (Forest) - The long-term reduction of the overall potential supply of benefits from the forest, which includes wood, biodiversity and any other product or service.	FAO 2000	N	Y	Legislation can reduce the potential supply of wood products from an area by making the lands unavailable for harvesting.
Degradation (Forest) (Bolivia) - Degradación: Proceso que consiste la transformación de un sistema, orden, estructura o sustancia compleja, a un nivel inferior. así tenemos la degradación biológica, de los bosques.	Source: Luis Castello faopaf@caoba.entelnet.bo Adjunto sírvase encontrar la versión no oficial y preliminar del Glosario Forestal elaborado por el Proyecto de Apoyo a la Coordinación e Implementación del Plan de Acción Forestal para Bolivia	N	C	The emphasis is on reducing biodiversity.
Degradation (Forest) (Canada - BC) - The diminution of biological productivity or diversity.	http://www.for.gov.bc.ca/pab/publctns/glossary/glossary.htm	N	C	Biodiversity or productivity may be reduced.
Degradation (Forest) (Italy) - Degradation concerns only human-induced damages or site alterations. The origin of these damages become by ongoing or	Castellani, C., et al 1983.	Y	Y	Here the site index or soil capacity is reduced.

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made in the past human actions and refers to irrational forest harvesting, fire, grazing, etc., which usually reduce permanently the site index and may negatively affect the stand.				
Degradation (Forest) (<i>Morocco and Yemen</i>) - An aggression on the forest as ecosystem, leading to a negative change in all its biotope (fauna, flora, soil, micro/meso climate). The productivity of the whole ecosystem is lower. Degradation could lead to erosion, drought, desertification and other calamities.	Mohammed Ellatifi, m.ellatifi@ellatifi.8m.com	N	Y	Does not have to be human-induced.
Degradation (Genetic) - Deleterious change in a native taxon's gene pool due to addition of non-local genes. The gene source can be plants of a) the same genus or species, but a non-local Californian taxon, ecotype or cultivar; b) the same genus, but a foreign taxon.	http://www.cnps.org/archives/landscaping.htm	N	N	
Degradation (Land) - The decline in condition or quality of the land as a consequence of misuse or overuse, involving changes to soil, flora, fauna, water quality and quantity, visual quality and production levels by humans	http://www.epa.nsw.gov.au/soe/95/28.htm	Y	Y	Requires a multitude of changes to be made. A loss of productivity alone would not constitute degradation if taken literally.
Degradation (Land) - The decline in condition or quality of the land as a consequence of human activities.	http://www.emrc.org.au/res/glossary.html#terms	Y	Y	A measure or indicator of quality is not provided
Degradation (Land) - The	http://www.adb.org/p	N	Y	

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deterioration or total loss of the productive capacity of land for present and future use. Such loss occurs mainly because of various forms of soil erosion (by wind and water) and of chemical and physical deterioration.	rojects/PRC_GEF_Partnership/LD_definition.pdf			
Degradation (Land) - The erosional removal of materials from one place to another, which lowers the elevation of streambeds and floodplains.	Dunster & Dunster. 1996.	N	N	This would be soil or land erosion.
Degradation (Land) - The temporary or permanent lowering of the productive capacity of land.	http://www.unu.edu/en/plec/1-degrade/index-toc.html	N	Y	
Degradation (Land) -The "reduction or loss, in arid, semi-arid and dry sub-humid areas, of the biological or economic productivity and complexity of rainfed cropland, irrigated cropland, or range, pasture, forest and woodlands resulting from land uses or from a process or combination of processes, including processes arising from human activities and habitation patterns, such as: (i) soil erosion caused by wind and/or water; (ii) deterioration of the physical, chemical and biological or economic properties of soil; and (iii) long-term loss of natural vegetation"	http://yahwood.com/glossary_uk.htm	Y	C	Note – this definition is limited to the drier areas.
Degradation (Log) -Any defect that lowers the grade or quality of a log	http://forestry.about.com/library/glossary/blforgld.htm and http://www.pfmt.org/	N	C	The defects could be physical (sweep, crook, etc.) or biological (insect, fire damage,

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	glossary/d.htm .			etc).
Degradation (Natural Habitat) - Modifications which substantially reduce a habitat's ability to maintain viable populations of its native species.	http://www.ifc.org/enviro/enviro/Review_Procedure_Main/Review_Procedure/Glossary_of_Terms/glossary.htm	N	C	Productivity is limited to native species
Degradation (Natural Resources) - Any decline in the quality of natural resources commonly caused by human activities.	http://www.emrc.org.au/res/glossary.html#terms and http://www.epa.nsw.gov.au/soe/95/28.htm	Y	N	Species diversity make up may be considered a quality. The establishment of plantations may increase carbon storage, but may decrease the "quality" of the area.
Degradation (Natural Resources) – The result of the cumulative activities of farmers, households, and industries, all trying to improve their socio-economic well being.	http://oaspub.epa.gov/trs/trs_proc_gry.alpha/bet?p_term_nm=D	Y	N	Interesting spin on the definition.
Degradation (Natural Resources) - Any decline in the quality of natural resources or the viability of ecosystems, caused directly or indirectly by human activities.	http://www.contactrust.org.za/BiodiversityNetwork/webpage/docs/glossary.htm	Y	C	
Degradation (Range) - The degeneration of a site caused by biotic or abiotic factors, which results in a lowered successional status to the point that ecological potential is changed	Www.plant-materials.nrcs.usda.gov/pubs/idpmctn280101.pdf and http://www.roseworthy.adelaide.edu.au/~icooper/glossary/r.htm	N	Y	
Degradation (Soil) - A decrease in soil quality as measured by changes in soil properties and processes, and the consequent decline in productivity in terms	http://www.unu.edu/env/plec/l-degrade/index-toc.html	N	Y	

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of immediate and future production.				
Degradation (Soil) - A set of types of soil degradation involving one or more of the following processes: loss of soil physical structure; sealing and crusting of soil surface; reduction in permeability; compaction of depth; increase in macroporosity; limitations to rooting.	http://www.unu.edu/env/plec/l-degrade/index-toc.html	N	N	
Degradation (Soil) - Any significant reduction in the fertility of a soil.	http://fwie.fw.vt.edu/rhgiles/appendices/glossd.htm	N	Y	Need threshold for what is considered significant
Degradation (Soil) - General lowering of land surfaces by erosion.	http://fwie.fw.vt.edu/rhgiles/appendices/glossd.htm	N	C	Humans could remove soil but that would not count according to this definition.
Degradation (Soil) - Loss of friability or fertility of soil resulting from leaching.	http://glossary.gardenweb.com/glossary/nph-ind.cgi?scrug=16677&k=degradation&b=and&r=whole&s=terms			
Degradation (Soil) - The decline in a soil's fertility as a result of loss of organic matter, erosion by wind or water, compaction, salinization, contamination, or acidification.	http://museum.gov.ns.ca/mnh/nature/nhns2/glossary.htm	N	Y	
Degradation (Soil) -The changing of a soil to a more highly leached and weathered state, usually accompanied by morphological changes such as the development of an eluviated, light-colored A (Ae) horizon.	http://sis.agr.gc.ca/cansis/glossary/degradation.html			
Degradation (Species) - The	http://www.mso.anu.e	N		

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state or condition of a species or group which exhibits degraded forms; degeneration.	du.au/~ralph/OPTED/v003/wb1913_d.html			
Degradation (Streambed) - A progressive lowering of the channel bed due to scour. Degradation is an indicator that the stream's discharge and/or sediment load is changing. The opposite of aggradation.	http://www.tpwd.state.tx.us/texaswater/rivers/glossaryleft.htm	N	N	
Degradation (Streambed) - The general lowering of the streambed by erosive processes, such as scouring by flowing water.	http://www.orst.edu/Dept/owrri/directory/glossary.htm#~D~	N	N	
Degradation (Water) - Deterioration in water quality due to contamination or pollution; makes water unsuitable for other desirable purposes.	http://www.mhhe.com/biosci/pae/glossary/glossaryd.mhtml	N	N	
Degradation (Wood) - Reduction in wood quality resulting from insect damage, fungal decay or fungal staining	http://216.239.51.100/search?q=cache:GISJPPoeSDUC:www.nre.vic.gov.au/web/root/domino/inf.Series/infsheet.nsf/ec560317440956e24a2568e3000bb3d9/5d033a7c16fbff3c4a25679c002137f4/%24FILE/AG0798.pdf+degrade+forest+glossary&hl=en	N	C	Note while this may degrade the wood, it may improve the biological diversity of the area.
Degraded - Having the typical characters or organs in a partially developed condition, or lacking certain parts.	http://www.mso.anu.edu.au/~ralph/OPTED/v003/wb1913_d.html			
Degraded – Reduced in worth or value or worn by erosion or weathering	http://www.sitesalive.com/admin/glossary/sectD.html	N	C	

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Definition	Source	Human-induced	Productivity Loss	Notes
<p>Degraded Forest - A secondary forest that has lost, through human activities, the structure, function, species composition or productivity normally associated with a natural forest type expected on that site. Hence, a degraded forest delivers a reduced supply of goods and services from the given site and maintains only limited biological diversity. Biological diversity of degraded forests includes many non-tree components, which may dominate in the under canopy vegetation.</p>	<p>http://www.biodiv.org/programmes/areas/forest/definitions.asp</p>	Y	C	<p>Taken literally, only secondary forests can be degraded. This may be linked to the definition of primary forest. Any human intervention in a “Primary” forest may make it a secondary forest.</p>
<p>Degraded Forest (Africa only) - Degraded forest are areas in Africa where human activity is visible. Due to the land use patterns, including selective logging, differentiation between deforestation/revegetation/agriculture is not currently possible. Generally discernible from natural forest, the true extent may only be determined through ground verification.</p>	<p>http://www.geog.umd.edu/tropical/per80v141README</p>	Y	N	
<p>Degraded Forest (Slovenia) - Forest in which the growth rate, or the fertility of forest land, is reduced, or other possibilities for it to perform its function as a forest are reduced by negative outside influences.</p>	<p>Slovenian LAW ON FORESTS - Milan SINKO milan.sinko@UNI-LJ.SI via "Maksym Polyakov" mpoliak@pcomp.usu.kiev.ua</p>	N	Y	
<p>Degraded Forest Stand - A forest stand that has suffered damage to natural composition,</p>	<p>http://www.web.net/~fscce/standard.htm#anchor88641</p>	Y	C	

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structures, and functions to such an extent that population levels and diversity of organisms have been changed in an unnatural manner, or where structures required for ecological processes and populations in later temporal phases have been removed and/or will not be regenerated due to human disturbance.				
Degraded Wetland – A wetland which has been altered by man through impairment of some physical property and in which the alteration has resulted in a reduction of biological complexity in terms of species diversity of wetland-associated species which previously existed in the wetland areas.	http://www.wsu.edu/pmc_nrcs/glossary/ddd.htm#D	Y	C	
Desertification - A fertile region that has been made barren by the activities of human societies	http://campus.murraystate.edu/academic/faculty/frank.elwell/Prob3/glossary/gloss1.htm#DECARCERATION	Y	Y	
Desertification - A process by which fragile, semiarid ecosystems lose productivity because of loss of plant cover, soil erosion, salinization, or waterlogging. Usually associated with human misuse.	http://www.mhhe.com/biosci/pae/glossary/glossaryd.mhtml	C	Y	Interesting that waterlogging could cause desertification
Desertification - A process of land degradation initiated by human activity, particularly in the zones along the margins of deserts	http://www.geat.iastate.edu/courses/Geol_100/glossary.v2.html	Y	C	
Desertification - A process whereby	http://www.alltel.net/~bsu	Y	Y	

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the productivity of drought-prone land decreases because of factors including deforestation, over-cultivation, drought, over-grazing (poor rangeland management), poor irrigation (waterlogging and salinization), soil erosion, chemical action and other practices.	ndquist1/og6.html#BM6C			
Desertification - Conversion of rangeland, rain-fed cropland to desert-like land, with a drop in agricultural productivity of 10% or more. It is usually caused by a combination of overgrazing, soil erosion, prolonged drought, and climate change.	http://ecology.org/biod/library/glos_index.html	C	Y	This definition is good because it specifies a threshold. However, it is limited to range and croplands.
Desertification - Dry land becoming desert, either through a change in climate or through the actions of humans. Intensive farming and clearing trees and other vegetation can make desertification worse.	http://www.oxfam.org.uk/coolplanet/glossary.htm	C	N	
Desertification - Land degradation in arid, semi-arid and dry sub-humid areas resulting from various factors, including climatic variations and human activities.	Www.asia-tpn1.net/glossary.html and http://www.nyo.unep.org/action/ap1.htm	C	Y	
Desertification - Land degradation in arid, semi-arid and dry sub-humid areas resulting mainly from adverse human impact (and climatic variations), and is therefore a sub-set of land degradation in countries that have additional climate zones.	http://www.adb.org/projects/PRC_GEF_Partnership/LD_definition.pdf	Y	C	
Desertification - Land degradation in arid, semi-arid, and dry sub-humid areas	http://www.gps.caltech.edu/~arid/desert/desert.html	Y	C	

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resulting mainly from adverse human impact.				
Desertification – Land degradation occurring in the arid, semiarid and dry subhumid areas of the world. These susceptible drylands cover 40 percent of the earth's surface and puts at risk more than 1 billion people who are dependent on these lands for survival.	http://www.nrcs.usda.gov/technical/worldsoils/landdeg/degredation.html	N	N	
Desertification – Progressive destruction or degradation of existing vegetative cover to form desert. This can occur due to overgrazing, deforestation, drought, and the burning of extensive areas.	http://www.hwwa.de/Projekte/Forsch_Schwerpunkte/FS/Klimapolitik/PDFDokumente/Michaelowa.%20Koch%20(2001).pdf	C	C	
Desertification - The (usually) slow and progressive degradation of land towards a desert state.	http://www.rbgkew.org.uk/aboutus/annualreport/sect5.pdf	C	C	
Desertification -The conversion of ecosystems into barren land	http://www.hq.nasa.gov/iwgsdi/ISS_SDI_Climate.html	N	C	Taken literally, the clearing of land for a parking lot may qualify as a desert.
Desertification - The degradation of terrestrial ecosystems as a result of deforestation, overgrazing, poor soil, and irrigation management.	http://www.orst.edu/Dept/owrri/directory/glossary.htm#~D~	Y	C	
Desertification - The diminution or destruction of the biological potential of the land, (which) can lead ultimately to desert-like conditions.	UN Secretariat 1977	N	Y	
Desertification - The diminution or destruction of the biological potential of land, and can lead ultimately to desert-like conditions	http://www.gps.caltech.edu/~arid/desert/desert.html	N	C	
Desertification - The extension of the desert into another ecological system such as into tropical grasslands.	http://www.kgv.edu.hk/eden/glossary.php	N	N	This sort of puts a positive spin on the change.
Desertification - The land	United Nations	C	Y	

Table 1 – Listing of published definitions of degraded forest, devegetation, desertification, and related terms (as of 9 December 2002)

Definition	Source	Human-induced	Productivity Loss	Notes
degradation in arid and semi-arid areas, caused by climatic changes and human impact"	Environment and Development Conference, Rio de Janeiro in 1992 (Görçelioglu, 1992). In this definition it was emphasised that, desertification was not the only the problem of arid zones but also semi-arid zones. http://www.toprak.org.tr/isd/isd_53.htm			
Desertification - The man-made or natural formation of desert from usable land.	http://www.casde.unl.edu/vn/glossary/earth_d.htm#desertification and http://asd-www.larc.nasa.gov/asd_over/glossary/d.html and http://earthobservatory.nasa.gov:81/Library/glossary.php3?mode=alpha&seg=d	C	Y	An interesting aspect here is that the land has to be usable initially.
Desertification -The process by which an area or region becomes more and through loss of soil and vegetative cover. The process is often accelerated by excessive continuous overstocking and drought.	http://www.roseworthy.adelaide.edu.au/~icooper/glossary/d.htm	C	N	
Desertification - The spread or encroachment of a desert environment into arid or semiarid regions, caused by climatic changes, human influence, or both.	http://www.britannica.com/eb/article?eu=30548&tocid=0	C	Y	
Desertification - The transformation of once-productive arid and semi-arid areas into deserts through prolonged drought or continued	http://www.nrcan.gc.ca/cfs-scf/science/prodserve/glossary_e.html#23 and	C	Y	Limited to arid and semi-arid lands.

Table 1 – Listing of published definitions of degraded forest, devegetation, desertification, and related terms (as of 9 December 2002)

Definition	Source	Human-induced	Productivity Loss	Notes
mismanagement of land and water resources.	http://www.fnfp.gc.ca/rep99/gloss-e.htm			
Desertification -The (usually) slow and progressive degradation of land towards a desert state.	http://www.rbgkew.org.uk/aboutus/annualreport/sect5.pdf	N	Y	
Desertification -The degradation of terrestrial ecosystems as a result of deforestation, overgrazing, poor soil, and irrigation management.	http://www.orst.edu/Dept/owrri/directory/glossary.htm#~D~	Y	C	Climate not a consideration
Desertification -The process by which lands not formerly deserts become deserts, because of changes in temperature and rainfall	http://www.solutions-site.org/reference/glossary.htm	N	C	Note, changes are not directly attributed to humans
Desertification -The process by which once productive land is turned into a desert by processes such as overstocking or removal of protective vegetation.	http://www.epa.nsw.gov.au/soe/95/28.htm	C	Y	
Desertification -The process of a non-desert ecosystem taking on the characteristics of a desert (arid, seemingly barren) as a result of land mismanagement or climate change.	http://www.pbs.org/earthedge/glossary.html	C	Y	
Desertification -The process of becoming arid land or desert (as from land mismanagement or climate change).	http://sol.crest.org/renewables/SJ/glossary/D.html	C	N	
Desertification -The process of desert spread	http://www.learn.co.uk/default.asp?WCI=Unit&WCU=7568	N	C	
Desertification -The process of land degradation which leads to a drastic reduction of land productivity. Land is rendered unsuitable for any productive activity. It is prevalent in arid and	http://www.rri.wvu.edu/WebBook/Briassoulis/glossaryterms.htm	C	Y	Note the land is “unsuitable for ANY productive activity.

Table 1 – Listing of published definitions of degraded forest, devegetation, desertification, and related terms (as of 9 December 2002)

Definition	Source	Human-induced	Productivity Loss	Notes
<p>semi-arid areas. Its causes are both natural (dry climate, low rainfall, water shortage) as well as anthropogenic (overgrazing, deforestation, fires, intensive cultivation).</p>				
<p>Desertification -The process through which a desert takes over a formerly non-desert area. When a region begins to undergo desertification, the new conditions typically include a significantly lowered water table, a reduced supply of surface water, increased salinity in natural waters and soils, progressive destruction of native vegetation, and an accelerated rate of erosion.</p>	<p>http://www.iversonsoftware.com/geology/desertification.htm</p>	N	N	
<p>Desertification -The process through which once usable land is turned into desert because of overgrazing, harmful agricultural practices, or deforestation</p>	<p>http://cwabacon.pearsoned.com/bookbind/pubbooks/social_ab/chapter4/custom1/deluxe-content.html#desertification</p>	N	Y	Climate and drought are not factors.
<p>Desertification -The progressive destruction or degradation of existing vegetative cover to form desert.</p>	<p>http://edugreen.teri.res.in/explore/glossary.htm#d and http://www.ciel.org/Publications/climatechangelanglossary.pdf</p>	N	N	
<p>Desertification -The progressive destruction or degradation of existing vegetative cover to form desert. This can occur due to overgrazing, deforestation, drought and the burning of extensive areas. Once formed,</p>	<p>http://www.ccasia.teri.res.in/gloss/glossary.htm</p>			

Table 1 – Listing of published definitions of degraded forest, devegetation, desertification, and related terms (as of 9 December 2002)

Definition	Source	Human-induced	Productivity Loss	Notes
desert can only support a sparse range of vegetation. Climatic effects associated with this phenomenon include increased albedo, reduced atmospheric humidity and greater atmospheric dust loading, which can cause wind erosion and/or atmospheric pollution.				
Desertification -The spread of deserts.	http://mac01.eps.pitt.edu/harbbook/other/Glossary.html			
Desertification - When an area begins to develop desert-like conditions due to lack of water, deforestation, overgrazing and over cropping.	http://www.dnr.state.sc.us/climate/sercc/education/glossary/#d	C	N	
Devegetated - Having removed the vegetation from an area.	Lund 2002	N	N	Implied in this definition is that the vegetation has to be killed off. Mowing the lawn, for example, would not count as devegetation.
Devegetation - Destruction of vegetation (by fire, human impact).	http://www.nature.nps.gov/nrbib/HTML%20files/33.htm#3259	C	N	
Devegetation -The removal of vegetation and exposure of bare soil throughout at least one growing season.	Lund 1998	N	N	
Diminished Forest Land - area and percent of forest land with diminished biological components indicative of changes in fundamental ecological processes (e.g. soil, nutrient cycling, seed dispersion,	http://www.hq.nasa.gov/iwgsdi/SDI_Org_USDA.html	N	C	

Table 1 – Listing of published definitions of degraded forest, devegetation, desertification, and related terms (as of 9 December 2002)

Definition	Source	Human-induced	Productivity Loss	Notes
pollination)				
Disturbance (Forest) - Any discrete force, for instance fire, wind, disease, insects, or logging, that significantly alters forest composition, structure, and/or functioning. Natural disturbances include all historical disturbances that influenced forests prior to European contact, including those resulting from First Nations' use.	http://www.silvafor.org/ecocert/sffstandard/sforbc.pdf	C	C	
Disturbed forest - A forest that has changed or been degraded due to human impact.	http://ohia.com/ohia/roadshows/sky/glossary.htm	Y	N	
Underproducing Forestland (USA-Oregon) - Any forestland that is capable of producing at least 20 cubic feet of wood fiber per acre per year at culmination of mean annual increment, but does not currently support the minimum number of free-to-grow trees required in the reforestation rules under the Forest Practices Act." Oregon Administrative Rule (OAR 629-22-020 (22)) The operational meaning of this definition is marginal agriculture, pasture or brush land capable of supporting a commercial forest that is currently not stock with a manageable stand of trees or seedlings and not subject to the reforestation requirements of the Oregon Forest Practices Act. The last piece (not subject to the reforestation requirements of the Oregon Forest Practices Act)	http://www.odf.state.or.us/forasst/SF/FRT/summary.htm	N	N	Could conceivably include old-growth stands.

Table 1 – Listing of published definitions of degraded forest, devegetation, desertification, and related terms (as of 9 December 2002)				
Definition	Source	Human-induced	Productivity Loss	Notes
excludes cutover land following timber harvest from our definition of underproducing land. Another operation interpretation is that underproducing land is "additional" from the perspective of generating forestry carbon offsets if forestation of these lands occurs. The Forest Resource Trust is primarily funded with a \$1.5 million dollar carbon dioxide emissions reduction investment from an Oregon power plan.				

SM1.2 Antonyms

One way to approach defining key terms is to use a “back door” approach – defining what it is not. The use of antonyms helps in this regard. We need to consider accounting for forest and vegetation improvement and restoration as well as for degradation or else one could never come up in the positive side. Table 3 lists antonym definitions dealing with restoring vegetation. Note: “aggradation” is listed as an antonym of “degradation” hence it is included in this table. For definitions of afforestation and reforestation, see <http://home.att.net/~gklund/DEFpaper.htm>.

Table 3 - Listing of published definitions dealing with restoration and related terms (as of 9 December 2002)		
Definition	Source	Lund Notes
Accretion or Aggradation (Beach) - Natural accretion is the buildup of land on a beach by natural deposition of waterborne or airborne material. The process may be managed or accelerated by human action.	http://museum.gov.ns.ca/mnh/nature/nhns2/glossary.htm	Applies only to beaches.
Aggradation - Filling in or	http://sis.agr.gc.ca/cansis/glossar	

Table 3 - Listing of published definitions dealing with restoration and related terms (as of 9 December 2002)

Definition	Source	Lund Notes
leveling by deposition.	y/aggradation.html	
Aggradation -The general smoothing of the earth's surface by deposition due to air or aquatic transport of material.	http://www.envirottools.org/glossary.shtml	Unlike other definitions, this mentions smoothing of the Earth's surface.
Aggradation (Land) - Building up of land surfaces by sedimentation or deposition of mineral matter. The depositional process itself. The growth of a permafrost area.	http://courses.washington.edu/es/c110a/environmentalglossary.html	Applies only to soils. Note reference to permafrost
Aggradation (Streambed) - The process of building up surfaces, such as stream-beds or floodplains, by the deposition of sediment and/or colluvium	http://140.211.62.101/streamwater/glossary.htm	Applies to soils
Aggradation (Streambed) - A progressive buildup or raising of the channel bed and floodplain due to sediment deposition. The geologic process by which streambeds are raised in elevation and flood plains are formed. Aggradation indicates that stream discharge and/or bed-load characteristics are changing. Opposite of degradation.	http://www.tpwd.state.tx.us/streamwater/rivers/glossaryleft.htm	
Rehabilitate - To return an area of land or a road or track surface to an original, proper and stable condition. This may involve reshaping, spreading topsoil, construction of banks and revegetation.	http://www.privateforestry.org.au/gloss_o-z.htm	
Rehabilitation - Making the land useful again after a disturbance. It involves the recovery of ecosystem functions and processes in a	http://www.oregonwri.org/basin-info/floodrpt.html	

Table 3 - Listing of published definitions dealing with restoration and related terms (as of 9 December 2002)

Definition	Source	Lund Notes
<p>degraded habitat. Rehabilitation does not necessarily reestablish the predisturbance condition, but does involve establishing geological and hydrologically stable landscapes that support the natural ecosystem mosaic.</p>		
<p>Rehabilitation - The process of making land "productive" again. An alternative ecosystem is created with different structure and function than the original ecosystem. It usually has low species diversity and includes introduced species. It requires maximal human input to exist. Land uses include parklands, croplands, and commercial forests.</p>	<p>http://www.epa.nsw.gov.au/soe/95/28.htm</p>	
<p>Reinstate - Introduce to a place one or more species or elements of habitat or geo-diversity that are known to have existed there naturally at a previous time but that can no longer be found at that place. (Natural Heritage Charter). See also: Revegetate</p>	<p>http://www.contacttrust.org.za/BiodiversityNetwork/webpage/docs/glossary.htm</p>	
<p>Restoration - Returning land to an original state or repairing damage done by human or natural disturbance.</p>	<p>http://gardening.wsu.edu/text/nvglossr.htm</p>	
<p>Restoration - The process of improving habitats</p>	<p>http://www.waterlink.org.nz/info/glossary.html</p>	
<p>Restoration - The recreation of communities of organisms resembling, in structure, function and dynamics, those prior to degradation, and protected from further human degradation</p>	<p>http://www.greenpeace.org/~commms/cbio/forp&g.html#annex</p>	

Table 3 - Listing of published definitions dealing with restoration and related terms (as of 9 December 2002)

Definition	Source	Lund Notes
<p>Restoration - To increase or return species, structures, and processes that are currently diminished locally, regionally, or statewide, to locations on the property that have high capability/potential for both accommodating and sustaining these currently scarce resources. It would attempt to include missing successional stages and patch sizes. Or, to simply to return forest cover to presently /deforested areas.</p>	<p>http://www.dnr.state.wi.us/master_planning/Brule/Documents/PrefAlt.pdf</p>	
<p>Restoration (Active) - Specific human actions taken to reestablish the natural process, vegetation, and resultant habitat of an ecosystem.</p>	<p>http://buttecreekwatershed.org/ecr/new/glossary.htm</p>	
<p>Restoration (Ecological) - The process of intentionally altering a site to establish a defined, indigenous, historic ecosystem. The goal of this process is to emulate the structure, function, diversity, and dynamics of the specified ecosystem.</p>	<p>http://www.wsu.edu/pmc_nrcs/glossary/rrr.htm</p>	
<p>Restoration (Ecological) - The process of renewing and maintaining ecosystem health.</p>	<p>http://www.wsu.edu/pmc_nrcs/glossary/rrr.htm</p>	
<p>Restoration (Ecological) - The process of returning an ecosystem as closely as possible to predisturbance conditions and functions. Implicit in this definition is that ecosystems are naturally dynamic; it is therefore not possible to recreate a system exactly. The restoration process reestablishes the</p>	<p>http://www.oregonwri.org/basin-info/floodrpt.html</p>	<p>Note emphasis on restoring land for human use.</p>

Table 3 - Listing of published definitions dealing with restoration and related terms (as of 9 December 2002)

Definition	Source	Lund Notes
<p>general structure, function, and dynamic but self-sustaining behavior of the ecosystem. Restoration differs from rehabilitation in that restoration is a holistic process not achieved through the isolated manipulation of individual elements. While restoration aims to return an ecosystem to a former natural condition, rehabilitation implies putting the landscape to a new or altered use to serve a particular human purpose.</p>		
<p>Restoration (Ecological) - The return of an ecosystem to a close approximation of its natural condition prior to disturbance. The goal is to emulate a natural, functioning, self-regulating system that is integrated with the ecological landscape in which it occurs. It may involve the manipulation of natural processes of ecological succession to create a self-sustaining indigenous ecosystem. The restored ecosystem should simulate the natural condition before it was damaged, or some other native ecosystem appropriate for the new conditions of the landscape. It must be stable with a minimum of human input after the initial efforts that may involve hastening the rate of plant succession, reverting to an earlier seral stage, or altering the direction of succession.</p>	<p>http://www.wsu.edu/pmc_nrcs/glossary/rrr.htm</p>	<p>Human input is limited after the site becomes stable.</p>
<p>Restoration (Ecology) - Seeks</p>	<p>http://www.mhhe.com/biosci/pae</p>	<p>Emphasis is only on sites</p>

Table 3 - Listing of published definitions dealing with restoration and related terms (as of 9 December 2002)

Definition	Source	Lund Notes
to repair or reconstruct ecosystems damaged by human actions.	/glossary/glossaryr.mhtml	damaged by humans.
Restoration (Ecosystem) - Restoring and maintaining the physical, chemical, and biological conditions necessary to allow natural ecosystems to function and evolve overtime.	http://www.nh.nrcs.usda.gov/Ecosystem_Restoration/Publications/Ecosystem%20Restoration%20Standard.pdf	
Restoration (Ecosystem) - The process of repairing damage to the diversity and dynamics of ecosystems.	http://www.oregonwri.org/basin-info/floodrpt.html	
Restoration (Ecosystem) - The process of returning ecosystems or habitats to their original structure and species composition.	http://www.fscstandards.org/regions/southeast/glossary.html	
Restoration (Ecosystem) - The repair of ecological damage to an ecosystem so that it is close to the natural condition prior to a disturbance and it can function as a normal self-regulating system. This is done through processes such as chemical cleanups, revegetation, and the reintroduction of native species.	http://www.internet.ve/wildlife/glossario.htm	
Restoration (Ecosystem) - The return of an ecosystem or habitat toward: its original structure, natural complement of species, and natural functions or ecological processes.	http://www.safnet.org/policy/cosstrategy1013.pdf	
Restoration (Ecosystem) - The return of an ecosystem or habitat to its original community structure, natural complement of species, and natural functions (World	http://www.forestry.utoronto.ca/ac_staff/emeritus/My%20Webs/english.htm	

Table 3 - Listing of published definitions dealing with restoration and related terms (as of 9 December 2002)

Definition	Source	Lund Notes
Resources Institute et al. 1992)		
<p>Restoration (Ecosystem) - The return of an ecosystem to a close approximation of its condition prior to disturbance.</p>	<p>http://www.tpwd.state.tx.us/texaswater/rivers/glossaryleft.htm</p>	
<p>Restoration (Forest) - Assisting the recovery of forest ecosystems from a degraded state to full functioning. A key part of this definition, from the standpoint of ecological responsibility, is its limitation of people's role in most cases to assisting, rather than fixing, natural processes. Usually the least risky approach is to respect and emulate those natural processes that reestablish the composition and structures and develop the biological diversity necessary for the return or improvement of forest functioning that has been lost or degraded. In some cases, restoration will require more radical intervention by humans.</p>	<p>http://www.silvafor.org/ecocert/sffstandardsforbc.pdf</p>	
<p>Restoration (Habitat) - To restore or bring back ecological integrity by actively removing invasive exotic plants, propagating native plants, and monitoring the resulting changes.</p>	<p>http://www.nps.gov/goga/parklabels/toolbox/images/curriculumshd/htd5.pdf</p>	
<p>Restoration (Land) - The process of restoring site conditions as they were before land disturbance. Note: restoration involves restoring a site to a specific point in time.</p>	<p>www.plant-materials.nrcs.usda.gov/pubs/idp/mctn280101.pdf</p>	
<p>Restoration (Wetland) - Re-establishment of previously existing wetland or other</p>	<p>http://www.mawpt.org/pdfs/Strategy.pdf and www.wrsc.usace.army.mil/iwr/p</p>	

Table 3 - Listing of published definitions dealing with restoration and related terms (as of 9 December 2002)

Definition	Source	Lund Notes
aquatic resource character and function (s) at a site where they have ceased to exist, or exist only in a substantially degraded state	df/wmb_tp2_Dec95.pdf	
Restoration (Wetland) - The processes of returning a site from a disturbed or totally altered condition to a previously existing natural or altered condition. This process requires some knowledge of the type of wetland that existed prior to modification.	http://parks.state.co.us/cnap/Wetlands_BMP/17%20-%20Glossary.pdf	
Restoration (Wetland) - To improve a disturbed wetland by returning wetland parameters which may be missing; adding soils, water, or plants. The restoration may return a missing or damaged wetland function to achieve a desired outcome; for example, removing an agricultural crop and planting native seeds to produce wet prairie grassland.	http://www.ci.eugene.or.us/wewetlands/glossary2.htm	
Restoration/Revegetation - Reestablishing a habitat or plant community in an area that historically supported it.	http://buttecreekwatershed.org/ecr/new/glossary.htm	
Restore Ecosystems - To reinstate an entire community of organisms to naturally occurring association.	http://www.mhhe.com/biosci/pae/glossary/glossaryr.mhtml	
Restore Habitats - Return existing habitats to a known past state or to an approximation of the natural condition by repairing degradation, by removing introduced species or by reinstatement. (Natural	http://www.contacttrust.org.za/BiodiversityNetwork/webpage/docs/glossary.htm	

Table 3 - Listing of published definitions dealing with restoration and related terms (as of 9 December 2002)

Definition	Source	Lund Notes
Heritage Charter).		
Restored Forests - Forests planted, seeded, or otherwise restored in such a manner as to emulate the original natural forests of an area	http://www.af.nfr.no/andre-doc/alternativ-agenda/Forests.html , http://www.igc.org/habitat/treaties/at-27.htm and http://nativenet.uthscsa.edu/archives/nl/9208/0081.html	Note emphasis on restoring to a natural state. This is opposed to “reforestation” which may mean just re-establishing tree cover – natural or otherwise.
Revegetate - Introduce to a place plant species that are known to have existed there naturally at a previous time.	http://www.contacttrust.org.za/BiodiversityNetwork/webpage/docs/glossary.htm	
Revegetate - Reestablishing vegetation on a disturbed site.	http://www.efw.bpa.gov/PSA/N-EPA/DOCUMENTS/LOWERVALLEY/chapter10.pdf	Does not have to be native vegetation.
Revegetate - The act of planting reclaimed land with grasses, trees, crops, etc.	http://dnr.state.il.us/mines/lrd/guides/farm6.htm	Does not have to be native vegetation.
Revegetate - The establishment of an effective vegetative ground cover by either natural regeneration or sowing with a seed and fertiliser mixture, to prevent soil erosion. It is preferable to use sterile hybrids if using exotic species.	http://www.privateforestry.org.au/glos_o-z.htm	Does not have to be native vegetation.
Revegetate - The natural or induced replacement of plants into a cleared area.	http://www.mhhe.com/biosci/pae/glossary/glossaryr.mhtml	Does not have to be native vegetation.
Revegetate - The recurrence of the same plant community that existed prior to clearing.	http://www.mhhe.com/biosci/pae/glossary/glossaryr.mhtml	
Revegetate - To cover bare mineral soil with plant re-growth. In BMP application, this refers to the expeditious establishment of grasses to minimize soil erosion.	http://www.forestry.state.ar.us/bmp/glossary.html	Does not have to be native vegetation.
Revegetate - To reestablish vegetation in a restoration site by planting and seeding of indigenous species.	http://www.nps.gov/goga/parklabels/toolbox/images/curriculumshd/htd5.pdf	

Table 3 - Listing of published definitions dealing with restoration and related terms (as of 9 December 2002)

Definition	Source	Lund Notes
<p>Revegetate - The re-establishment and development of a plant cover. This may take place naturally through reproductive processes of the existing flora or artificially through the direct action of reforestation or seeding.</p>	<p>www.superiornationalforest.org/july4thstorm1999/Appendix%20B.doc</p>	
<p>Revegetation - A general term for renewing the vegetation on a project site.</p>	<p>www.plant-materials.nrcs.usda.gov/pubs/idp/mctn280101.pdf</p>	
<p>Revegetation - Establishing or re-establishing desirable plants in areas where desirable plants are absent or of inadequate density, by management alone (natural revegetation) or by seeding or transplanting (artificial revegetation).</p>	<p>www.plant-materials.nrcs.usda.gov/pubs/idp/mctn280101.pdf and http://www.roseworthy.adelaide.edu.au/~icooper/glossary/r.htm</p>	
<p>Revegetation - General expression used for the process of planting bare areas (raw mineral soils) to perennial plants or less often to annual plants.</p>	<p>http://www.wsu.edu/pmc_nrcs/glossary/rrr.htm</p>	
<p>Revegetation - Planting of grasses, forbs, shrubs and trees in areas where vegetation has been removed, or in some-way disrupted or damaged. Revegetation is conducted under two different conditions: irrigated and nonirrigated. commercial and industrial areas.</p>	<p>http://www.cityofboise.org/pds/Comp-Plan/Foothills/Appendix-A.pdf</p>	
<p>Revegetation - Refers to the vegetation construction phase of reclamation.</p>	<p>www.plant-materials.nrcs.usda.gov/pubs/idp/mctn280101.pdf</p>	
<p>Revegetation - Replanting a cleared area with native plants. -</p>	<p>http://gardening.wsu.edu/text/nv/glossr.htm</p>	<p>Note emphasis on native plants</p>
<p>Revegetation -The</p>	<p>http://parks.state.co.us/cnap/Wet</p>	<p>Note emphasis on perennial</p>

Definition	Source	Lund Notes
establishment of perennial vegetative cover on disturbed areas by planting seed.	lands_BMP/17%20-%20Glossary.pdf	vegetation.
Revegetation - The establishment of vegetation which replaces original ground cover following land disturbance. (Powter, 1995)	http://www.agric.gov.ab.ca/publiclands/nprg/glossary.html	
Revegetation - The planting of vegetation following either manual removal of existing vegetation or gradual dying off of once-present vegetation.	http://www.ci.menlo-park.ca.us/creek/MPAppendixA.pdf	Does not have to be native vegetation.
Revegetation - The process of replanting vegetation that previously existed at a site.	http://www.waterlink.org.nz/info/glossary.html	
Revegetation - To plant or provide an area with new plant cover.	http://www.nps.gov/goga/parklands/restoration/plant.htm	

SM1.3 Parallel Definitions

Its possible to draw parallels between the changes which forests or ‘other vegetation’ undergo as they are removed completely, removed partially, re-established, restored, enriched or established afresh. These terms are outlined in Table 1, and considered in more detail in Table 4, which also shows the manner in which the new definitions derived in this Chapter for degradation, devegetation and restocking fit alongside those defined in the Marrakech Accords.

Change	Forest (tree cover)	Other vegetation or (land use)
“Permanent” removal of cover below thresholds	Deforestation	Devegetation
Partial removal of cover reducing land capability to produce goods and services over long term	Forest degradation	Vegetation degradation
Re-establishment of cover	Reforestation	Revegetation

Change	Forest (tree cover)	Other vegetation or (land use)
at or above thresholds		
Restoration of “original ³ ” cover	Forest restoration	Vegetation restoration
Increase of cover beyond “original” condition	Forest improvement	Vegetation improvement
Creation of cover where it did not previously exist	Afforestation	Vegetation or avegetation?

1.1.1 SM1.4 Types of Degradation

Degradation in a forest environment may apply to genes, tree, the species composition, the soils, the water and the landscape. One must decide which types of degradation are important to monitor. Table 2 lists types of degradation and their impact upon monitoring.

Type of “Degradation”	Change in carbon sequestration⁴	Time frame	Ease of measurement	Severity from an IPCC view
Wood, Tree	No	Short	Degradation in standing trees may be observed from visual indicators such as conks. Degraded wood may increase biodiversity.	Slight
Change in species composition, biodiversity	Possibly- depends on what replaces the lost species	Short	Changes in species composition may best be observed in the field	
Reduction of tree cover percent	Yes	Short to long term if there is a change in land use as well	This may be detected from remote sensing	

³ Original may be the situation at the start of the first reporting period.

⁴ Consider Newton’s third theorem – “For every action, there is an equal and opposite reaction.” A degradation of one feature may be an improvement of another.

Type of “Degradation”	Change in carbon sequestration⁴	Time frame	Ease of measurement	Severity from an IPCC view
Change in habitat, environment, ecosystem	Possibly – depends on what replaces the habitat.	Long term	This may be detected by remote sensing or from the field.	Extreme
Site, land, loss of soil	Yes	Long term	Loss of site productivity may be observed in the field over a period of time by measuring the growth rate of the trees. The question may arise “Is the change climatic or human- induced?”	
Desertification	Yes	Long term	As above	

Forest degradation usually implies a loss of productivity. Operations such as thinning and salvage logging, while reducing the canopy cover, may not reduce the productivity of the forest. In fact it may increase it. Thus overstory reduction alone may not be regarded as degraded forest.

Change in species composition may not mean a degraded forest from a productivity view. One could plant genetically improved or faster growing exotic trees and increase carbon storage.

Task 2 authors agreed that the UNFCCC definition of ‘forest degradation’ should: a) work within the Marrakech definitions of ‘forest’, ‘deforestation’ and ‘reforestation’; b) be easily, reliably and repeatably measured by techniques described in the Good Practice Guide for the characterisation of forest structure; c) not include measurements of other goods and services which are difficult to quantify, and which distract from the role of forests in carbon-sequestration; d) allow reporting of changes in greenhouse gas emissions separately from the structural characteristics which are exclusively used to define ‘degradation’. Using these criteria, all the above definitions of forest degradation were judged unsuitable for FCCC, and the following suggested definition was adopted:

- *Forest degradation⁵ is a direct human-induced loss of forest values (particularly carbon), likely to be characterised by a reduction of tree crown cover. Routine management from which crown cover will recover within the normal cycle forest management operations is not included.*

⁵ FAO asked IPCC to consider ‘destocking’ rather than degeneration

SM1.5 Devegetation

We found only three definitions of devegetation. From an IPCC perspective, the field is wide open. In developing a definition for “devegetation” consider including words such as the destruction and removal of current vegetation below a specified stocking or crown cover threshold. Both the words “destruction” and “removal” should be included. One could remove vegetation and plant it elsewhere –such as a sod farm – so there would be no loss of carbon. If the grass were destroyed – then there would be a carbon loss. Harvesting does not quite fit as one could “harvest” grass through mowing, but the growing part of the vegetation remains.

Task 2 authors agreed that the UNFCCC definition of ‘forest degradation’ should: a) work with the Marrakech definitions of ‘revegetation’; b) be easily, reliably and repeatably measured by techniques described in the Good Practice Guide for the characterisation of forest structure; c) not include measurements of other goods and services which are difficult to quantify, and which distract from the role of forests in carbon-sequestration; d) allow reporting of changes in greenhouse gas emissions separately from the structural characteristics which are exclusively used to define ‘degradation’; e) be clear on the minimum areas involved; f) be clear on the time-period involved. Using these criteria, all the above definitions of ‘devegetation’ were rejected and the following selected.

- *‘Devegetation’ is a direct human-induced activity that decreases carbon stocks through the changes in vegetation on non-forest land over an area of 0.05 hectares or greater. Changes within normal management cycles are not included.*

SM1.6 Other vegetation types

Term	Source	Comments
Vegetation type - A plant community with distinguishable characteristics.	http://www.umpqua-watersheds.org/glossary/gloss_v.html	
Vegetation Type - A plant community, assemblage, or aggregation with distinguishable characteristics.	http://fwie.fw.vt.edu/rhgiles/appendices/glossv.htm	
Vegetation Type - A standardized description of the vegetation in which a fire is burning. The type is based on the dominant plant species and the age of the forest and indicates how moist a site may be and how much fuel is likely	http://www.nps.gov/seki/fire/fire_gloss.htm	

Term	Source	Comments
to be present.		
Vegetation type -The potential natural vegetation of South Africa, Lesotho and Swaziland according to Low and Rebelo (1996).	www.csir.co.za/rhp/reports/report11/appendix%201.pdf	Note this focuses on potential

Based upon the intent of this task, we recommend that ‘Other vegetation types’ be defined as ‘non-forest-land’

SM1.7 Other Necessary Definitions

There are a number of terms contained within either definitions of degradation or devegetation, or the existing Marrakech definitions which need further clarification. Key amongst these is the introduction of the term ‘forest restocking’ which is necessary to represent an increase in cover from above the threshold at which it would be reforestation. The suggested terms retain a focus on ease of measurement and reporting:

- ‘Direct human-induced degradation of forests’ is defined as: ‘the sum of effects of those activities of humans working in, or using, ‘forests’, which cause a loss of tree biomass and carbon stocks’
- ‘Direct human-induced devegetation of other vegetation types’ is defined as: ‘the sum of effects of the activities of humans working in, or using, ‘other vegetation types’ which cause a loss of vegetation biomass and carbon stocks’.
- ‘Forest restocking’ is the direct converse of ‘forest degradation’, and involves a long-term increase in tree crown cover from a starting point above the minimum thresholds of ‘forest’.
- ‘Indirect human-induced degradation of forests’ is defined as: ‘the sum of effects of those activities of humans taking place outside the ‘forest’, or in society generally, which cause a loss of tree biomass and or carbon stocks’.
- ‘Indirect human-induced devegetation of other vegetation types’ is defined as: the sum of effects of the activities of humans outside areas of ‘other vegetation types’, or in society generally, which cause a loss of vegetation biomass and carbon stocks’.
- ‘Natural effects inducing degradation of forests’ is defined as: the sum of those non-anthropogenic effects that cause a loss of tree biomass and carbon stocks.
- ‘Naturally induced devegetation of other vegetation types’ is defined as: the sum of those non-anthropogenic effects that cause a loss of vegetation biomass and carbon stocks.