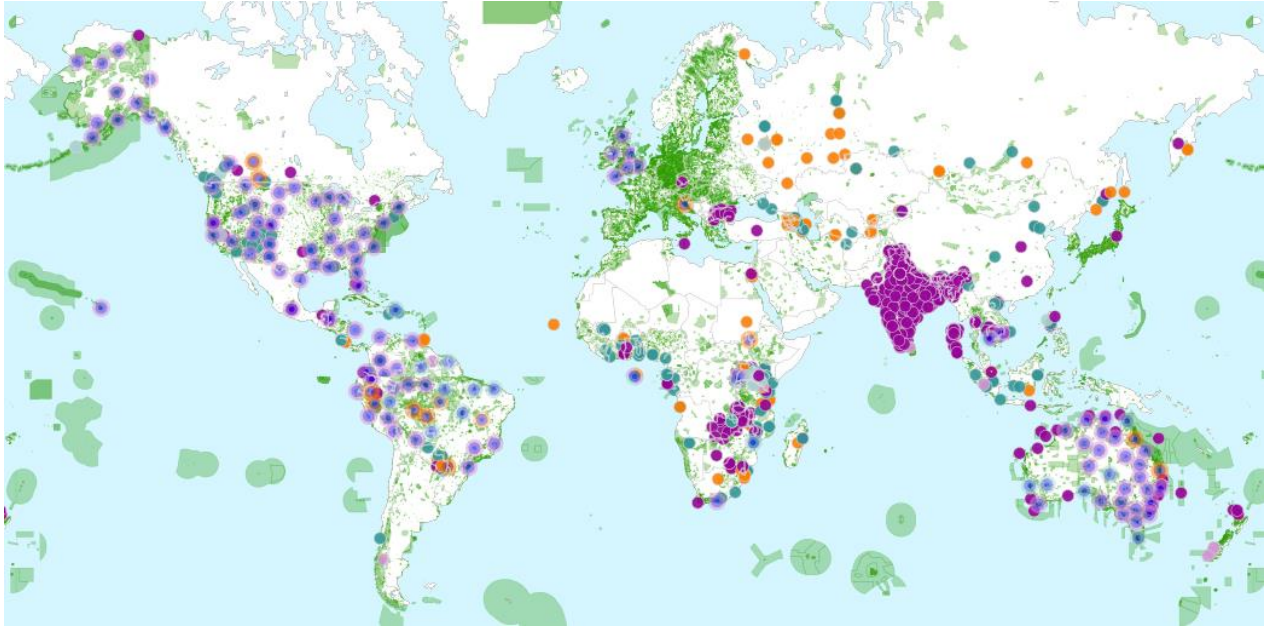


PADDTracker.org Technical Guide, Version 2

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This document updates [prior technical guidance](#): MB Mascia, S Pailler, R Krithivasan. 2012. PADDTracker.org Technical Guide (Version 1). World Wildlife Fund. Washington, D.C.



Table of Contents

Purpose and Audience of this Document.....	3
Background.....	3
Scope of Work.....	3
Key Definitions.....	4
Data Standards.....	6
Inconsistencies in Data Sources.....	7
A Note on the WDPA.....	7
Unit of analysis of PADDD database.....	8
Analysis of PADDD data: calculating area affected by PADDD.....	8
Considerations for tracking PADDD in Marine Protected Areas (MPAs).....	9
Decision Trees: Is it a PADDD event? What type of PADDD event?.....	11
Database attributes and definitions.....	15
PADDD Research “Cheat Sheet”	26
References	28
Selected additional PADDD research.....	29

PADDDtracker.org Technical Guide Version 2.0

Purpose and Audience of this Document

This technical guide outlines a standardized process to collect data on protected area downgrading, downsizing, and degazettement (PADDD) events. The guide is intended for researchers and practitioners who are interested in investigating historical and/or current PADDD events in any country. To date, this guidance has been applied to document PADDD in more than 70 countries, supporting evidence published in at least 10 peer-reviewed publications and informing dozens more (see References below and [Annotated Bibliography](#)). Peer-reviewed data of PADDD events are available for download on PADDDtracker.org.

Background

Conservation research, policy, and practice assumes that national parks and protected areas are permanent fixtures on the land and seascapes, but research demonstrates widespread – yet largely overlooked – legal changes or proposals that temper restrictions within, reduce boundaries of, or eliminate protected areas. These legal changes are known as protected area downgrading, downsizing and degazettement (PADDD) events. Since 2009, the PADDD research initiative has been collecting data on PADDD events from around the world to understand the extent, patterns, trends, causes, risks, and impacts of PADDD events, ultimately to advance understanding of the durability and effectiveness of protected areas and inform management and policy. The PADDD research initiative:

- Collects and analyzes data on PADDD events
- Translates findings and shares insights with conservation organizations, government agencies, civil society institutions, journalists, academic researchers, and the public
- Increases transparency and accountability to foster and enable improved natural resource decision making
- Advances the scientific understanding of contexts, mechanisms, and impacts of PADDD

Scope of Work

PADDDtracker.org collects data on PADDD events from all seven continents, spanning from 1872¹ to the present. This includes enacted PADDD events (i.e. legal changes that have been passed into law or regulation), and proposed PADDD events (i.e. proposed legal changes under formal consideration by government authorities, either currently or previously considered). PADDDtracker.org is intended to collect data on legal changes to protected areas that result in:

- downgrading (i.e. newly authorizing anthropogenic activities) of a protected area
- downsizing (i.e. reducing the size) of legal boundaries of a protected area
- degazettement (i.e. delisting, denotification, or de-reserving) of a protected area

¹1872 is the year that Yellowstone National Park, the first modern-era national park, was established.

Change to restrictions or boundaries of the protected area may be enacted or proposed by the relevant authority through legislative, executive, regulatory, or judicial means and must be documented as such by the appropriate authoritative body (including national and sub-national entities).

The PADD research initiative does not collect information on:

- New protected areas, expansions of, or upgrades to existing protected areas (unless directly associated with a PADD event)
- Corrections to protected area boundaries
- Protected area management
- Illegal activities within protected areas

Key Definitions

Protected area

For the purposes of this research, **protected areas** are defined in accordance with the IUCN definition:

“A protected area is a clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values” (Dudley 2008)

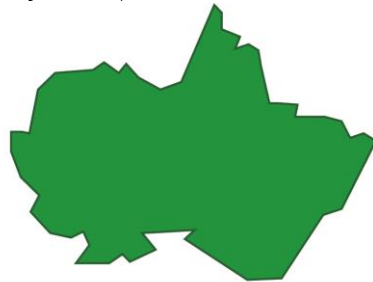


Figure 1: Graphical representation of a protected area

PADDTracker.org currently collects data for **state (government)-designated protected areas**, including sites designated at the national (i.e. federal) or sub-national (i.e. state or provincial) level.

At this time, PADDTracker does **not** include:

- Privately protected areas
- Indigenous territories or community conservancies
- Protected areas designated by international entities (eg. UNESCO World Heritage Sites or Biosphere Reserves, RAMSAR sites, etc.)
- Incentive or market-based conservation programs (including Payments for Ecosystem Services and eco-certification programs)
- Other area-based conservation systems that do not meet the IUCN definition for a protected area

Please note that a protected area may be state-**designated** but not **recognized** (i.e. the site is designated but not reported to the World Database of Protected Areas [WDPA]). Please also note that a site may be recognized as a protected area (e.g. reported to the WDPA) but is not state-designated (e.g. indigenous lands, privately protected areas). Under the data collection framework, PADDTracker includes protected areas that are state-designated, regardless of whether they are recognized (reported to the WDPA) due to known gaps in the WDPA (Smallhorn-West & Govan, 2018; You et al., 2018). PADDTracker also includes sites that meet the definition of a protected area and were historically gazetted and downgraded, downsized, or degazetted prior to the creation of the WDPA or its precursors – this includes, for instance, game reserves and national forests in African and Latin American countries.

PADD

PADD is **Protected Area Downgrading, Downsizing, and Degazettement**. Definitions for each term are below. For detailed explanations and additional context, see *Database attributes and definitions* (Table 1) and *Decision Trees* (Figures 3 – 6) below.

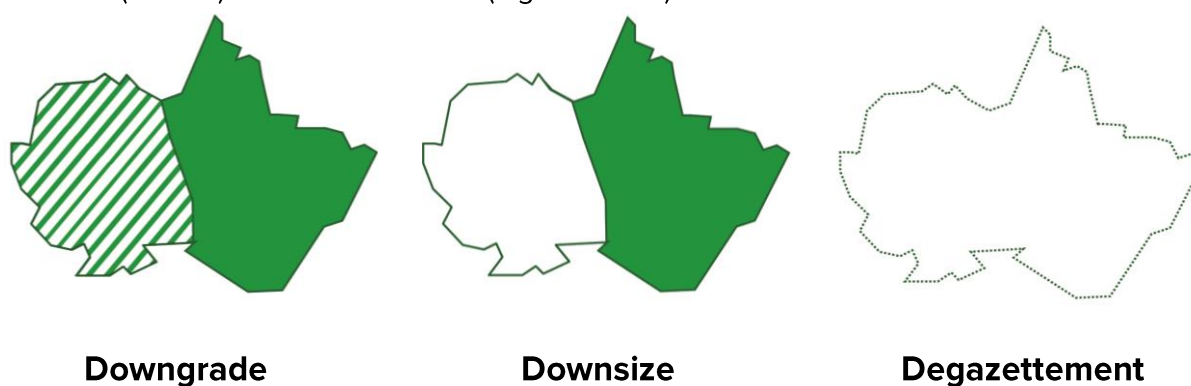


Figure 2: Graphical representation of protected area downgrading, downsizing, and degazettement (PADD)

Downgrade: a decrease in legal restrictions on the number, magnitude, or extent of human activities within a protected area

Downsize: a decrease in size of a protected area as a result of excision of land or sea area through a legal boundary change

Degazettement: a loss of legal protection for an entire protected area

Data Standards

Information about PADD is compiled from a variety of sources. To ensure consistency and rigor in data quality, users should follow these guidelines when documenting PADD events.

Acceptable sources

Tier 1 sources: Official, legal documents that authorize the PADD event; primary source. Sources are almost always reliable. Citation of a Tier 1 source alone is sufficient to confirm a PADD event. Includes:

- Legislation
- Presidential order (or decree, resolution, etc.)
- Agency or ministry regulation (or resolution, decree, accord, etc.)
- Formal proposal (e.g. proposed legislation, presidential order, or regulation)
- Judicial ruling, court order

Tier 2 sources: High quality secondary source documents that describe the PADD event. Source is usually reliable. Citation of a Tier 2 source alone is sufficient to confirm a PADD event, but confirmation with a Tier 1 source is desirable. Includes:

- Peer-reviewed journal articles
- Government reports, including protected area management plans
- Scholarly books (e.g. books published in university presses)

Tier 3 sources: Secondary sources that describe the PADD event. Sources are likely to be reliable, but at least two independent Tier 3 sources should be used to confirm the PADD event. Independent sources are distinct documents which present content deriving from separate entities (i.e. does not include two news articles reporting on the same press release). Includes:

- WDPA and other (e.g. national-level) protected area databases
- Publications and websites of international, national, and local NGOs
- Government websites
- Popular media/newspaper articles
- Official protected area websites
- Ranger association websites
- Conference proceedings
- Personal communication with regional experts

Tier 4 sources: Secondary sources that describe the PADD event but provide less reliable data. At least three or more independent sources of Tier 4 documents are required to confirm PADD events. Independent sources are distinct documents which present content deriving from separate entities (i.e. does not include two news articles reporting on the same press release). Includes:

- Personal communication with sources other than regional experts
- Tourism websites
- Research or travel blogs
- Wikipedia

Inconsistencies in Data Sources

Different sources may provide conflicting information. In such cases, please use the following guidelines to determine what to report when contributing data to PADDTracker. If different sources contain conflicting information, please also note the discrepancies in the “Supporting details field in the database.

1. If two sources from different tiers provide conflicting information, please use the information from the higher-tier source. For example: A peer-reviewed article (Tier 2) reports that a downsize affected 392 km² and was enacted in 1984, while an NGO website (Tier 3) reports that the downsize affected 390 km² and was enacted in 1985. In this case, report the data acquired from the peer-reviewed article (392 km², 1984). Information from a primary, legal document (Tier 1) would supersede both of these sources.
2. If two sources from the same tier contain conflicting information, please reconcile them as follows:
 - For area affected values: report the most conservative (smallest) value for areas. For example: if a government website reports that a downgrade affected 20 km², and a newspaper article reports that it affected 22 km², report the value provided on the government website (20 km²).
 - For years: report the earliest year documented. For example: if a government website reports that a downgrade occurred in 1974, and a newspaper article reports that it occurred in 1976, report 1974 as the year of the PADD event.

If higher-tier data or most-conservative data are known to be inaccurate according to an independent source(s), report the correct value and provide justification and citation(s) in the “Supporting details” and “Sources” section.

A Note on the WDPA

The base layer of protected areas on PADDTracker.org comes from the 2019 version of the World Database on Protected Areas (WDPa; UNEP-WCMC and IUCN 2019). The WDPa is housed at protectedplanet.net. For more information on this data, please see protectedplanet.net. Please note that while the WDPa is the most complete source of global spatial data on protected areas, it may contain errors; PADDTracker.org does not take responsibility for errors in the WDPa base layer. Please also note that some protected areas that are reported to the WDPa are outside the scope of the PADDTracker project as they are not state (government)-designated protected areas (e.g. privately protected areas, indigenous lands, community based natural resource management programs, international protected area designations, among others). In addition, some protected areas that are included in PADDTracker are not included in the WDPa (e.g. degazetted or unreported protected areas). Further, the WDPa may be used to supplement research on PADD (e.g. to provide leads for PADD events), but higher tier sources are required to confirm PADD events (see “Acceptable Sources”).

Unit of analysis of PADDD database

One PADDD event may affect one or more protected areas, a single protected area may be affected by more than one change throughout history or by more than one change at once, and/or a protected area with multiple polygons may be affected.

This list provides guidelines for how PADDDtracker organizes data:

- One legal change/new authorization affects one protected area: one row in database
- One legal change/new authorization affects X (more than one) protected area: X rows in database; this is a systemic PADDD event
- One protected area has been affected by Y separate legal changes (i.e. through separate authorizations in different years, through distinct legal documents): Y rows in database
- One legal change affects one protected area is comprised of Z separate units: one row that combines all Z separate units into one polygon and sums their area
- One legal change authorizes multiple types of PADDD events simultaneously (e.g. a downgrade **and** a downsize): one row for each type of event involved (one row for the downgrade and one row for the downsize)

Analysis of PADDD data: calculating area affected by PADDD

There are three indicators used to represent the area affected by PADDD events: *gross total area affected*, *absolute total area affected*, and *enduring total area affected*. *Gross total area affected* is simply the sum of all area affected values across PADDD events; calculations should distinguish between enacted and proposed events. Notably, gross total area is not usually the most appropriate calculation, as some protected areas are affected by multiple PADDD events and some PADDD events are later reversed. The *absolute* and *enduring total area affected* values account for these nuances to omit overlaps and avoids double counting, following accounting procedures published in Golden Kroner et al. (2019)

To avoid double counting of PADDD events that overlap spatially, calculate the *absolute total area affected* using the following procedure:

1. Split the database by enacted and proposed events and account for them separately.
2. Determine which protected areas were affected by PADDD events either once or multiple times using the field for the primary name of the protected area (primarynam).
3. For protected areas in which only one enacted or proposed PADDD event occurred, simply count the single area affected value once.
4. For protected areas in which multiple events were enacted or proposed, examine events grouped by the protected area primary name to avoid double counting overlapping areas, while accounting for relative timing of events. Use polygons, when available, to visually inspect data for overlaps. This process operationalizes the approach:
 - a. Start with the degazettements. Examine protected areas where multiple PADDD events occurred, including a **degazettement** as well as a downsize and/or a downgrade (or multiple downsizes and/or downgrades). For these, count the area affected by the degazettement plus the area of any downsizes that occurred

before the degazettement. However, if the protected area had previously been downgraded (before being downsized and/or degazetted) and the downgraded area was larger than the degazettement, count the larger (downgraded) area only. After this step, the review of all degazettements will be complete.

- b. Examine protected areas that were **downgraded** multiple times or affected by both a downgrade **and** a downsize (or multiple downsizes). For this group of PADD events, include the largest reported area affected value (usually a downgrade that covers the total spatial extent of the protected area). Add in the areas of any downsizes if they extend beyond (i.e. are outside of) the largest downgrade. After this step, the review of all downgrades will be complete.
- c. Examine protected areas that were **downsized** multiple times, but not downgraded or degazetted. Sum the area affected by each downsize, unless events overlap spatially, in which case, count each overlapping area affected only once.

In addition, certain enacted and proposed PADD events are later reversed. Calculate the *enduring total area affected* using the *absolute total area affected* value and include only active PADD events, defined as those which were not reversed or where reversal status was unknown.

Considerations for tracking PADD in Marine Protected Areas (MPAs)

The unique characteristics of marine protected areas (MPAs) warrant special considerations for tracking and recording PADD events, including related to zoning changes and area affected calculations. Technical considerations are listed below, structured for consistency with PADDTracker accounting procedure for terrestrial PAs.

Zoning changes: MPAs are often zoned to accommodate multiple management objectives. In these instances, different zones within the same MPA may have different IUCN categories and authorize different types, magnitude, or extent of anthropogenic activities than others. A zoning change in MPAs may constitute a PADD event (a downgrade) when, for example, anthropogenic activities are newly authorized within a particular zone, or zone boundaries are changed to authorize new or additional anthropogenic activities.

When a zoning change constitutes a PADD event (usually a downgrade), there may be multiple simultaneous shifts to zone boundaries within one MPA, or multiple MPAs may be affected. In these complex cases, the unit of analysis used in PADDTracker (one row) is one protected area, with the associated area affected by PADD recorded; each zoning change is not listed as a separate row. However, the database captures associated details at the level of the zone in the supporting details (including the number of changes, type of event, area affected, and newly authorized activities).

Zoning changes may trigger offsets, wherein one (or more) zone is downgraded, and another (or others) is upgraded simultaneously as compensation. The total area affected by offsets is recorded in the Offset Area column (off_area), and details about each individual offset are recorded in the Offset Details (off_details) column.

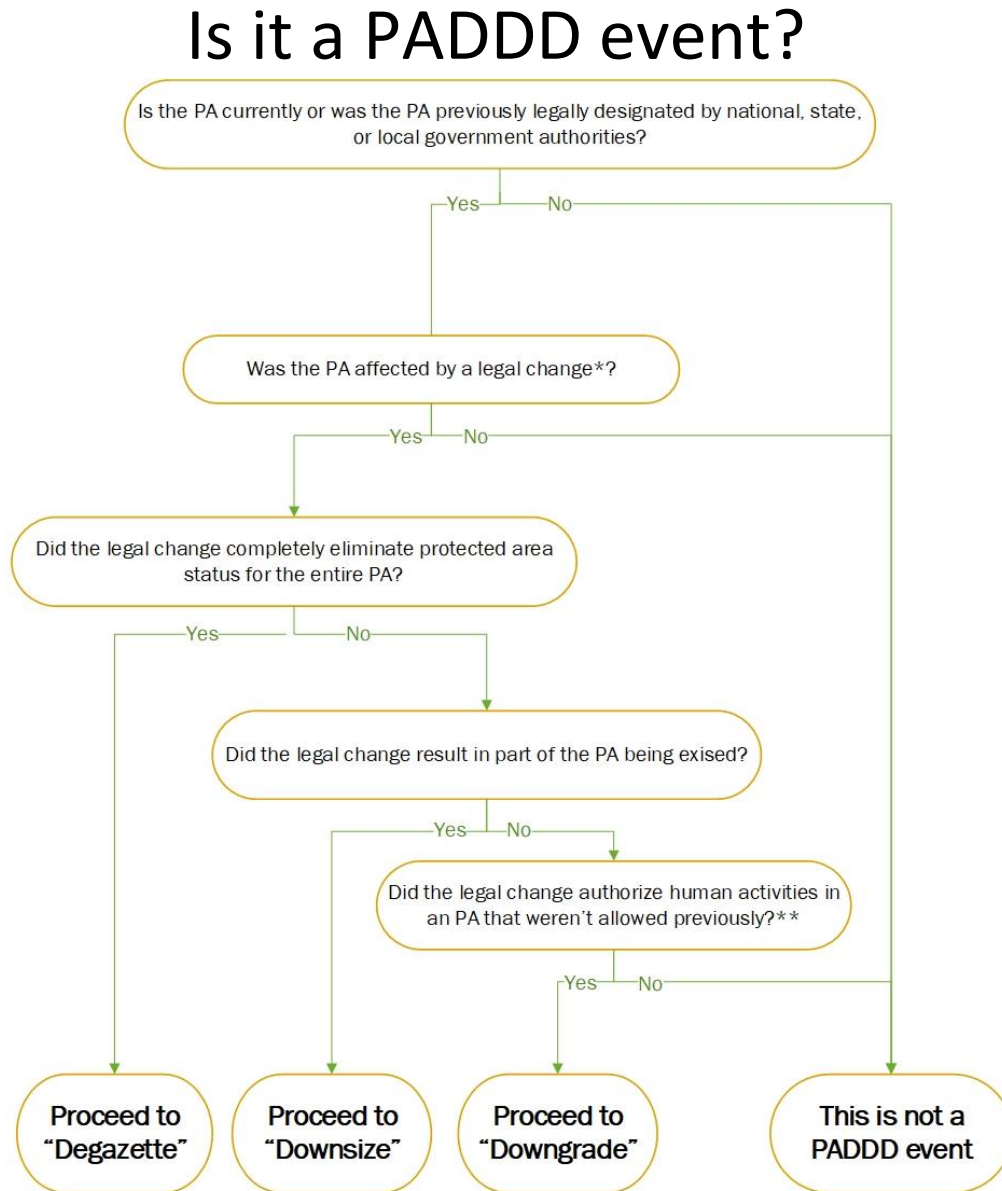
If a zoning change simultaneously tempers restrictions for some activities and increases restrictions for other activities within the same zone (for example, prohibiting previously authorized mining activities while simultaneously authorizing new commercial fishing gear types), this constitutes a downgrade with an offset.

Reversals that apply to only certain zoning changes within an MPA are recorded as partial reversals (Rev_Type). Details describing which PADD events were reversed, and for which zones, are recorded in the reversal details (Rev_Details).

Area affected: When a PADD event affects both terrestrial and marine areas (Marine = 1), the total area affected should be recorded (areaaffect). If known, the area affected in the ocean and the area affected on land portion should be recorded separately in the supporting details (Supporting). The World Vector Shoreline (Wessel and Smith 1996; NOAA 2017) base map layer should be used to distinguish between marine areas and terrestrial areas.

Decision Trees: Is it a PADD event? What type of PADD event?

Use the following decision trees (Figures 3 – 6) to confirm (or reject) candidate PADD events (i.e. leads), and classify as either a downgrade, downsize, or degazettement. If you are uncertain of an answer, please select “no” and proceed to the next question. Refer to relevant documentation (government reports, legal documents, publications, etc.) to answer questions as accurately as possible.

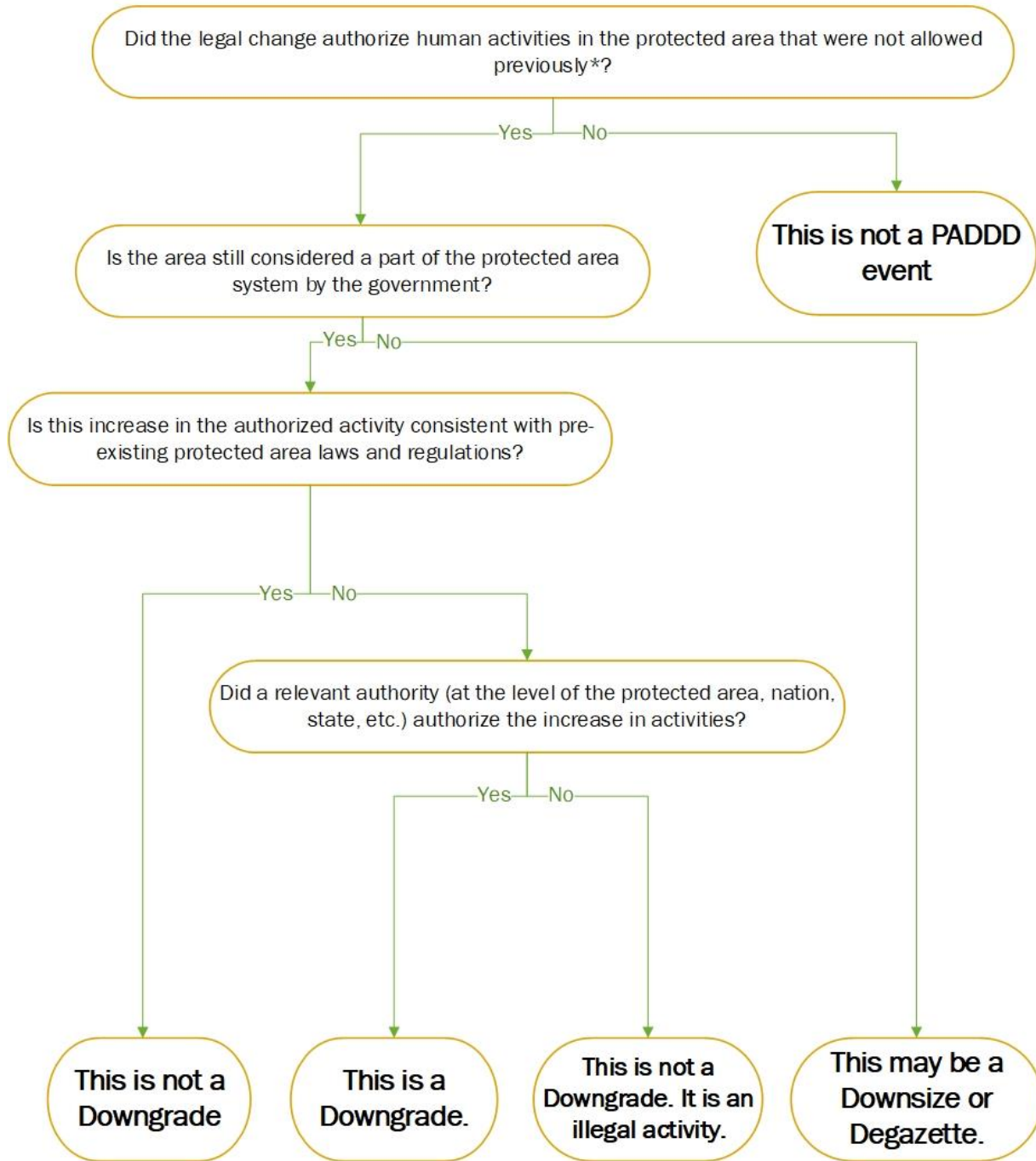


*A PADD event is **enacted when downgrading, downsizing, or degazettement** has been legally executed by a relevant government authority. A PADD event is considered enacted when the downgrade, downsize, or degazettement has been authorized (e.g. legislation signed, regulation promulgated), even if the legal decision has not been implemented. A PADD event is **proposed when a plan to downgrade, downsize, or degazette** is under formal consideration by a relevant government authority.

**Refers to an increase in the types, magnitude, or extent of human activities allowed.

Figure 3. Decision tree 1: Is it a PADD event?

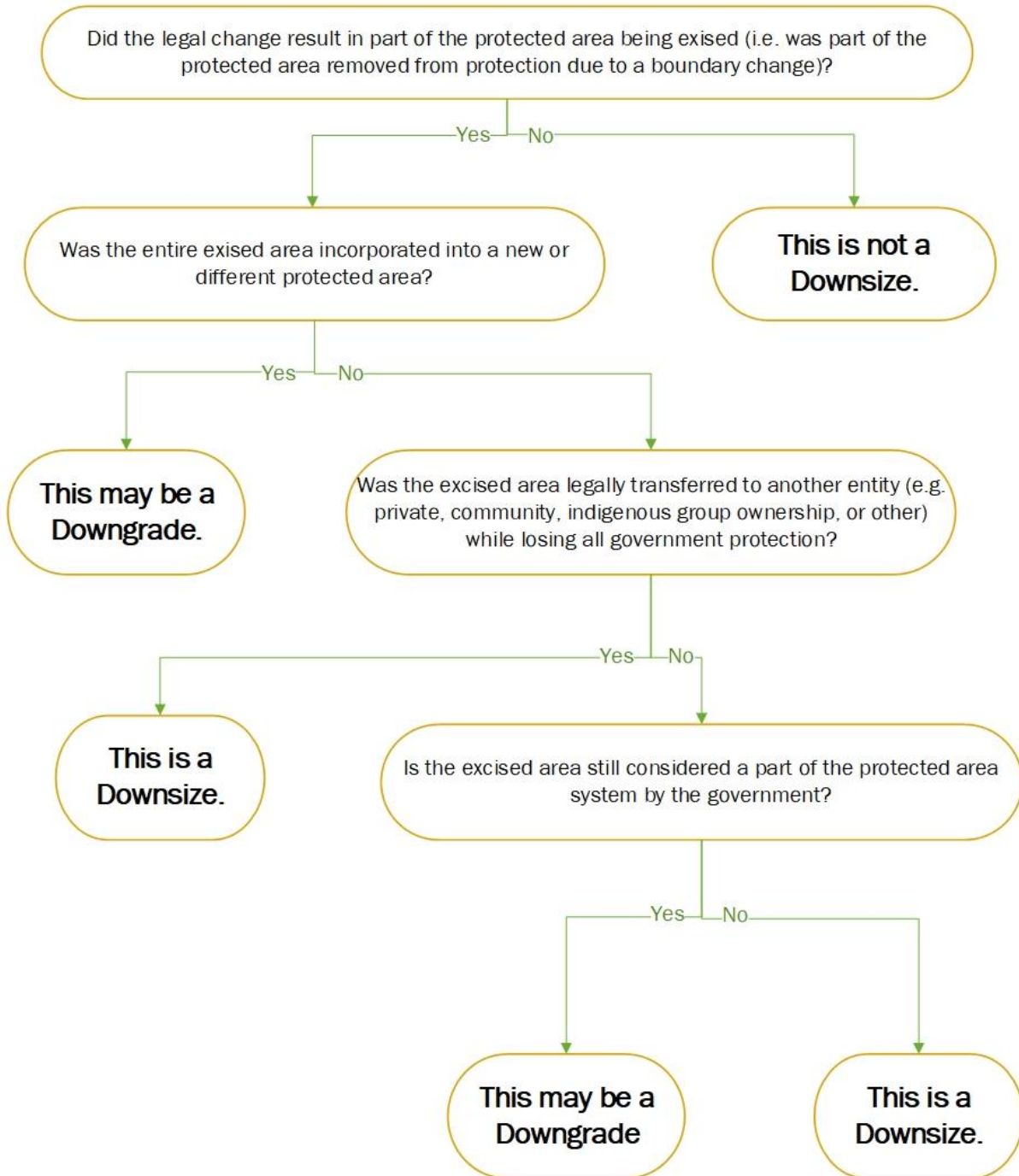
Is it a Downgrade?



*Note that this is simply an increase in legally authorized activities. The activity need not have commenced in order for it to be considered a downgrade.

Figure 4. Decision tree 2: Is it a downgrade?

Is it a Downsize?



*Note that this is simply an increase in legally authorized activities. The activity need not have commenced in order for it to be considered a downgrade.

Figure 5. Decision tree 3: Is it a downsize?

Is it a Degazettement?

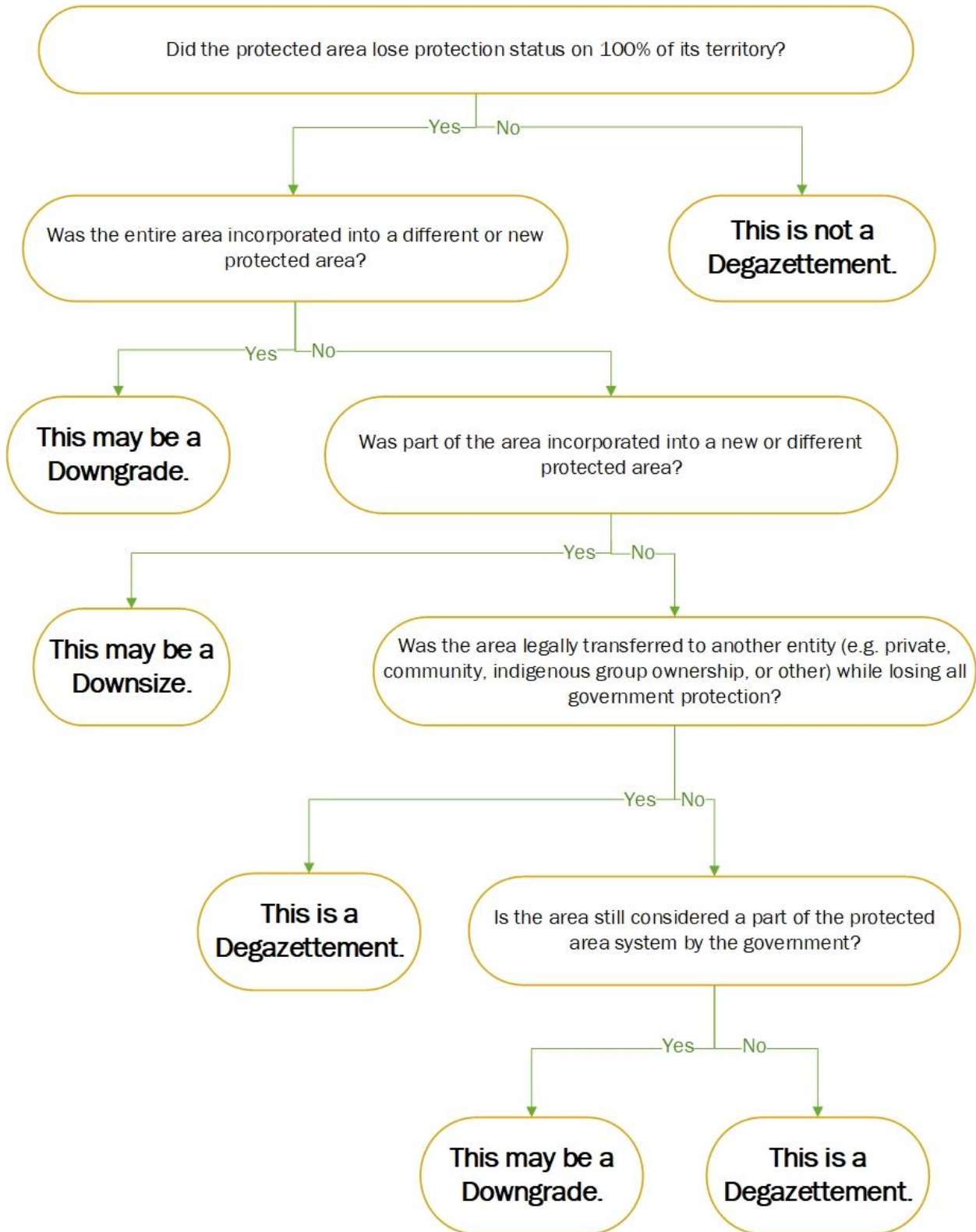


Figure 6. Decision tree 4: Is it a degazettement?

Database attributes and definitions

Table 1 lists and defines the attributes (columns) used in the PADDTracker.org database. All information should be entered in English, except where otherwise specified. Criteria is applicable to PADD events on land, as well as marine areas.

Table 1: PADD database structure and field definitions

Attribute Name	Attribute Definition	Values Entered	Definitions and Clarifications
Prim_Key	Primary Key	Unique identifier for each PADD event	ID linking the excel sheet with the shapefiles/spatial information
GeoDataType	Type of spatial data	Point, Polygon	
Region	Region of the world in which the PADD event was enacted or proposed	Africa, Asia, Latin America and the Caribbean, Northern America, Oceania, Europe	Follows the UN statistics division's definitions of countries: https://unstats.un.org/unsd/methodology/m49/
Country	Country in which the PADD event was enacted or proposed	Country Names	Follows the UN statistics division's definitions of countries: https://unstats.un.org/unsd/methodology/m49/
ISO3166	Three letter country code	ISO codes	Follows the UN statistics division country codes: https://unstats.un.org/unsd/methodology/m49/
WDPAID	ID number assigned to the protected area by the WDPA		See https://www.protectedplanet.net/ for WDPA IDs
Location_K	Is the location of the PADD event known?	y, n	<ul style="list-style-type: none"> • If the location of a degazettement (and hence the location of the entire protected area) is unknown, place the point for the PADD event on the capital city of the country. • If the location of a downsize is unknown, place a point at the centroid of the protected area polygon. • If the location of a downgrade is unknown, use the boundary of the entire protected area to represent the PADD event.
primarynam	Name of protected area at the time	Protected Area Names	Use the WDPA for the primary protected area name, if available. If not available, use the highest tier information available.

	PADDD was enacted or proposed		
allnames	All other names associated with the protected area	Protected Area Names	Includes previous names of the protected area, names of the protected area if it was changed after a PADDD event, local names, and alternative spellings for the protected area name. Compiled from WDPA, national-level databases, and other sources.
EventType	Type of legal change affecting the protected area.	Downgrade	<p>A decrease in legal restrictions on the number, magnitude, or extent of human activities within a protected area by the relevant authority. Note that an activity may be authorized but it need not be implemented or practiced.</p> <p>Clarification of Terms: Number: additional categories or types of human activities are authorized Magnitude: the maximum authorized limit of activity, in amount or intensity, is increased Extent: the maximum limit of area on which activities are authorized is increased</p> <p>Note that multiple authorities may have jurisdiction over protected areas. For example, the above-ground resources in a protected area may be under the authority of the Environmental Ministry, while all materials under the ground are under the jurisdiction of the Ministry of Mines. In such cases, both would be considered relevant authorities capable of increasing the number, magnitude, or extent of human activities authorized in a protected area.</p> <p>Further operational criteria for qualification as a downgrade include:</p> <ul style="list-style-type: none"> • If an activity is carried out and is not in violation of existing laws, this does not constitute a downgrade. For example, if a permit for oil exploration is issued when oil exploration is legally authorized, this does not constitute a downgrade as the authorizing legislation already exists, and no legal <i>change</i> has taken place. However, a national or protected area level decision to authorize an activity when it was not previously authorized constitutes a downgrade. • An increase in activities in a protected area due to lack of enforcement of rules/laws or poor management does not constitute a downgrade. • The area affected must still be legally recognized as a protected area by that country. If the protected area status is legally eliminated for some or all of the protected area, this may qualify as a downsize or degazettement (not a downgrade). • Devolution of authority over a protected area from higher to lower levels of government (e.g. federal to state, or state to community) constitutes a downgrade only if the devolution is accompanied by a legal increase in the number, magnitude or extent of human activities authorized in a protected area and if the land remains a part of the national protected area system. If the land is no longer a part of the protected area system (legally designated by the national government as a protected area) after transfer of authority to a private group, this is a downsize or degazettement. • Devolved authority from state actors to private ownership constitute downgrades only if the devolution of power is accompanied by a legal increase in the number, magnitude or extent of human activities authorized in a protected area, and if the land remains a part of the national protected area system. If the land is no longer a part of the protected area system after transfer of authority to a private, community, or indigenous group, this may be a downsize or degazettement.

			<ul style="list-style-type: none"> • An increase in illegal activities does not constitute a downgrade. For example, an increase in illegal quarrying does not constitute a downgrade. However, if an appropriate authoritative body newly authorizes quarrying when it had previously been illegal, this constitutes a downgrade. • Downgrades can be reflected in the protection status given to the protected area by the country's authority, such as a change in name or level of protection (e.g. from a "National Park" to an "Extractive Forest Reserve") only if the new legal framework authorizes an increase in the number, magnitude, or extent of human activities. • A downgrade event cannot be confirmed solely on the basis of differing management plans, where an earlier plan explicitly prohibits an activity, but a later management plan does not make explicit mention of the prohibition. Declarative statements acknowledging a legal increase in number, magnitude, or extent of prohibited/authorized activities are required to confirm a downgrade. • Changes in IUCN category are insufficient to confirm a downgrade event; additional supporting documentation is required to demonstrate a legal increase in the number, magnitude, or extent of human activities was authorized.
		Downsize	<p>A decrease in size of a protected area as a result of excision of land or sea area through a legal boundary change</p> <p>Further operational criteria for qualification as a downsize include:</p> <ul style="list-style-type: none"> • If less than 100% of the protected area is legally transferred to private, community, or indigenous group ownership while losing government protection, this qualifies as a downsize. • If a protected area is degazetted, and simultaneously, a portion of the original extent is added to a new or existing protected area(s) as part of an explicitly associated legal change (e.g. at the same time, part of the same legal document, within the same legislative session), this qualifies as a downsize. For example, if Park X of 100 km² is legally degazetted and two smaller parks of 45 km² each are gazetted within the former boundaries of Park X in an explicitly associated legal change, it qualifies as a functional downsizing of 10 km². To determine if the two legal changes are explicitly associated, refer to supporting documentation and provide details in the Supporting Details field. • Protected area boundary changes resulting solely from the correction of cartographic, GIS, or survey errors do not qualify as downsize events.
		Degazette	<p>Loss of legal protection for an entire protected area</p> <p>Further operational criteria for qualification as a degazettement include:</p> <ul style="list-style-type: none"> • If a protected area is degazetted and then immediately (e.g. within the same legal document or in an explicitly associated legal change) re-gazetted as a protected area of less restrictive status and/or smaller size, this may be a downgrade and/or downsize. • When there is a legal transfer of a protected area to private, community, or indigenous group ownership, 100% of the protected area territory must be legally transferred while losing government protection in order to qualify as a degazettement. For transfers of less than 100%, see "Downsize." • When there is a legal transfer of a protected area to a private, community, or indigenous group, and the associated transfer of authority is partial or ambiguous, a degazettement is

			<p>considered enacted if the protected area is removed from the relevant government authority's official lists of protected areas after the decision.</p> <ul style="list-style-type: none"> • PADDTracker records PADD events for sites that were downgraded, downsized, or degazetted prior to the creation of the WDPA that may meet the definition of a protected area but may not have been recognized or reported to official protected area lists. In general, PADDTracker errs on the side of inclusion of protected areas when screening for PADD events. If there are conflicting sources of information about what to count as a protected area, use the primary or secondary documents (see "Acceptable Sources") to decide and record all sources and supporting details. • Protected areas that are no longer legally considered to be a part of a protected area system by the applicable authority (national, state, provincial, or local), but are still managed by that authority, are degazetted. For instance, an existing category of protected area is no longer considered by a country's government to be part of their protected area system, but the area is still held as federal land. • A protected area in which management ceases (or is "shut down") for war, political unrest, or budgetary constraints, does not qualify as degazetted unless the above definition and applicable criteria have also been met.
EnactedPro	The status of a downgrade, downsize, or degazettement	Enacted	A PADD event is considered enacted when downgrading, downsizing, or degazettement has been approved by a relevant government authority, even if the legal decision has not been implemented. For example, the law changes to newly authorize mining within protected areas. Even if mining activity has not commenced, this is considered an enacted downgrade at the time of the approval of the new law.
		Proposed	<p>A PADD event is proposed when a plan to downgrade, downsize, or degazette is under formal consideration by a relevant government authority. This includes but is not limited to a proposal for downgrading, downsizing, or degazettement under consideration the parliament, congress, senate, or other body.</p> <p>Proposed PADD does not include:</p> <ul style="list-style-type: none"> • Demands to downgrade, downsize, or degazette by citizens, NGOs, or other non-government actors who do not have direct authority over protected areas. • Changes to proposed boundaries of protected areas before they are gazetted (e.g. the protected area was originally proposed to be 100 km² and then was gazetted to be 85 km²).
YearPAGaze	The year in which the protected area was legally established (i.e. gazetted, inscribed)	1872 - present	<ul style="list-style-type: none"> • If a protected area was downgraded to a different classification or its name was changed (e.g. National Park to National Game Reserve), the year gazetted is the original year in which the protected area was established under its original designation. • If a protected area is degazetted, then re-gazetted in later years, the year gazetted is the year in which the protected area was first established, and not the year in which it was re-established. • Note that the WDPA attribute for "Status Year" may differ from the original year that the protected area was gazetted. "Status Year" represents the year that the protected area's current status was assigned (e.g. as a National Park), so does not always capture the year that the protected area was first established. • PADDTracker records the original legal gazette or inscription date, according to the legal document, although the protected area may be implemented or definitively categorized

			<p>at a later date, consistent with the WDPA status of “designated” (as distinct from proposed, or established, UNEP-WCMC 2019).</p> <ul style="list-style-type: none"> • PADDTracker begins collecting data in 1872 to correspond with the establishment of the first modern-era national park (Yellowstone).
YearPADD	The year in which PADD was enacted or proposed	1872-present	PADDTracker begins collecting data in 1872 to correspond with the establishment of the first modern-era national park (Yellowstone).
Cause	The proximate (most closely associated) cause of enacted or proposed PADD event (choose from list)	Conservation Planning	Protected area downgrading, downsizing, or degazettement resulting from legal changes that are designed to enhance the conservation efficiency and efficacy of a class, group, or geographically distinct set of protected areas. Involves simultaneous reallocation of lands or regulatory changes to multiple protected areas. Does not include individual instances of degraded protected areas (see “Degradation”); excision of settlements (See “Rural Settlements”); or excision of protected areas that no longer serves a conservation purpose (see “Degradation”). Excludes protected area downgrading, downsizing, and degazettement to attain non-conservation ends or divest from protected areas no longer serving a conservation function.
		Degradation	Protected area downgrading, downsizing, or degazettement in response to the degradation of the ecological, biophysical, touristic, symbolic, or other functions of a protected area, such that the protected area no longer fulfills its intended purpose(s). Includes degradation as a result of human activities or natural processes. Does not include degradation due to settlements in protected area (see “Rural Settlements”).
		Fisheries	Protected area downgrading, downsizing, or degazettement resulting from the legal authorization of previously prohibited industrial or semi-industrial scale wild-capture fishing operations. Includes fishing licenses, territorial use rights, and related activities for the harvest of marine and freshwater plants and animals. Does not include aquaculture or mariculture (see “Industrial Agriculture”) or non-industrial fisheries (see “Subsistence”).
		Forestry	Protected area downgrading, downsizing, or degazettement resulting from the legal authorization of previously prohibited industrial or semi-industrial scale forestry operations. Includes forestry concessions, timber plantations, logging activities, timber operations, logging camps, and related forestry activities. Does not include mills and other timber processing facilities (see “Industrialization”); non-timber plantations such as oil palm (see “Industrial Agriculture”); or forest clearing for agricultural expansion (see “Industrial Agriculture” or “Subsistence”).
		Industrial Agriculture	Protected area downgrading, downsizing, or degazettement resulting from the legal authorization of previously prohibited industrial or semi-industrial scale (i.e. mechanized) operations for agriculture or aquaculture. Includes industrial or semi-industrial row crops, tree crops, ranching, grazing, and other forms of animal husbandry, captive breeding of wildlife, and related activities. Also includes agricultural activities where scale is unspecified. Does not include small-holder agriculture (see “Subsistence”).
		Industrialization	Protected area downgrading, downsizing, or degazettement resulting from the legal authorization of previously prohibited industrial or semi-industrial scale non-extractive enterprises involved in the production or delivery of goods and services. Includes factories, mills, large scale real estate development (e.g., hotels, golf courses), urban housing projects, etc. Does not include factory farms (see “Industrial Agriculture”), sports facilities and stadiums (see “Infrastructure”).
		Infrastructure	Protected area downgrading, downsizing, or degazettement resulting from the legal authorization of previously prohibited structures that form the system of public works of a country, state, or region. Includes dams, roads, railways, pipes, electrical grid, power-generation facilities,

			telecommunications towers, transportation facilities, hospitals, schools, sports facilities, etc. Does not include churches or other religious institutions (see "Other"); tourism facilities (see "Industrialization").
		Land Claims	Protected area downgrading, downsizing, or degazettement resulting from legal restoration of full or partial rights to indigenous peoples or other local residents previously displaced or divested of <i>de jure</i> or <i>de facto</i> rights as a result of protected area establishment or management. Includes rights of access, withdrawal, management, exclusion, and alienation (Mascia & Claus, 2009; Schlager & Ostrom, 1992). Does not include excision of human settlements from protected areas (See "Rural Settlements").
		Mining	Protected area downgrading, downsizing, or degazettement resulting from the legal authorization of previously prohibited industrial or semi-industrial scale mining operations. Includes open-pit mines, underground mines, riverbed mines, quarrying, subsurface mines, and related activities for the extraction of metals, minerals, coal, rock, stone, sand, and other non-renewable resources, excluding oil and gas. Does not include coal-seam gas (see "Oil and Gas"); peat harvesting (see "Subsistence" or "Other" depending on scale of operation) or artisanal mining (see "Subsistence").
		Oil and Gas	Protected area downgrading, downsizing, or degazettement resulting from the legal authorization of previously prohibited industrial or semi-industrial scale operations for exploration or extraction of fossil fuels other than coal. Includes surveying and exploration, onshore and offshore drilling, and related activities. Does not include oil and gas refineries and other petrochemical operations (See "Industrialization"); gas pipelines (see "Infrastructure").
		Refugee Accommodation	Protected area downgrading, downsizing, or degazettement resulting from the legal authorization of previously prohibited camps for the accommodation of refugees or Internally Displaced Persons (IDPs). Does not include temporary refugee accommodation.
		Rural Settlements	Protected area downgrading, downsizing, or degazettement resulting from the legal authorization of previously prohibited rural human habitation. Includes settlements associated with migration to frontier regions. Does not include refugee accommodation (see "Refugee Accommodation") or restoration of rights to displaced persons (see "Land Claims").
		Shifting Sovereignty	Protected area downgrading, downsizing, or degazettement resulting from changes in sovereignty over/ownership of a parcel of land among nation-states, state/provinces, or local political jurisdictions. Includes changes in sovereignty as a result of shifting geopolitical boundaries, war or other armed conflicts, or related events.
		Subsistence	Protected area downgrading, downsizing, or degazettement resulting from the legal authorization of previously prohibited non-commercial or small-scale commercial, artisanal, or non-industrial (non-mechanized) extraction or production activities. These activities are often (but not always) for local or personal consumption. Includes small holder farming and grazing, non-timber forest product harvesting, fuel wood harvesting, hunting, fishing, artisanal mining, and related activities.
		Other	Any proximate cause of downgrading, downsizing, or degazettement that cannot be classified in any other category.
		Multiple Causes	A PADDD event may be related to more than one proximate cause as stated in the primary legal document. If so, please select "multiple causes" and specify the causes in the Supporting Details.
		Unknown	Proximate cause is unknown.
Areaaffect	Area affected by PADDD	Area values (km ²)	<ul style="list-style-type: none"> • <i>For enacted PADDD</i>: area no longer protected due to downsizing or degazettement; area of reduced restrictions due to downgrading. • <i>For proposed PADDD</i>: proposed area that would no longer be protected due to downsizing or degazettement; proposed area that would have reduced restrictions due to downgrading.

			<ul style="list-style-type: none"> When a PADD event affects both terrestrial and marine areas, the total area affected should be recorded. If known, the area affected in the ocean and the area affected on land portion should be recorded separately in the supporting details (Supporting).
Size_Pre	Size of protected area before PADD	Area values (km ²)	<ul style="list-style-type: none"> <i>For enacted PADD</i>: size of protected area before PADD event <i>For proposed PADD</i>: size of protected area when PADD was proposed
Size_Post	Size of protected area after PADD	Area values (km ²)	<ul style="list-style-type: none"> <i>For enacted PADD</i>: size of protected area after PADD event <i>For proposed PADD</i>: size of protected area if PADD proposal were enacted. Size post-PADD may be larger than Size pre-PADD if the protected area was increased in size at the same time that another portion was downsized (see "Offset").
IUCN_pre	IUCN category before PADD (Dudley 2008)	Ia	Strict Nature Reserve: Strictly protected for biodiversity and also possibly geological/geomorphological features, where human visitation, use and impacts are controlled and limited to ensure protection of the conservation values
		Ib	Wilderness Area: Usually large unmodified or slightly modified areas, retaining their natural character and influence, without permanent or significant human habitation, protected and managed to preserve their natural condition
		II	National Park: Large natural or near-natural areas protecting large-scale ecological processes with characteristic species and ecosystems, which also have environmentally and culturally compatible spiritual, scientific, educational, recreational and visitor opportunities
		III	Natural Monument or Feature: Areas set aside to protect a specific natural monument, which can be a landform, sea mount, marine cavern, geological feature such as a cave, or a living feature such as an ancient grove
		IV	Habitat/Species Management Area: Areas to protect particular species or habitats, where management reflects this priority. Many will need regular, active interventions to meet the needs of particular species or habitats, but this is not a requirement of the category
		V	Protected Landscape/ Seascape: Where the interaction of people and nature over time has produced a distinct character with significant ecological, biological, cultural and scenic value: and where safeguarding the integrity of this interaction is vital to protecting and sustaining the area and its associated nature conservation and other values
		VI	Protected area with sustainable use of natural resources: Areas which conserve ecosystems, together with associated cultural values and traditional natural resource management systems. Generally large, mainly in a natural condition, with a proportion under sustainable natural resource management and where low-level non-industrial natural resource use compatible with nature conservation is seen as one of the main aims
		unk	IUCN category unknown or not assigned
IUCN_post	IUCN category before PADD (Dudley 2008)	Ia	Strict Nature Reserve: Strictly protected for biodiversity and also possibly geological/geomorphological features, where human visitation, use and impacts are controlled and limited to ensure protection of the conservation values
		Ib	Wilderness Area: Usually large unmodified or slightly modified areas, retaining their natural character and influence, without permanent or significant human habitation, protected and managed to preserve their natural condition

		II	National Park: Large natural or near-natural areas protecting large-scale ecological processes with characteristic species and ecosystems, which also have environmentally and culturally compatible spiritual, scientific, educational, recreational and visitor opportunities
		III	Natural Monument or Feature: Areas set aside to protect a specific natural monument, which can be a landform, sea mount, marine cavern, geological feature such as a cave, or a living feature such as an ancient grove
		IV	Habitat/Species Management Area: Areas to protect particular species or habitats, where management reflects this priority. Many will need regular, active interventions to meet the needs of particular species or habitats, but this is not a requirement of the category
		V	Protected Landscape/ Seascape: Where the interaction of people and nature over time has produced a distinct character with significant ecological, biological, cultural and scenic value: and where safeguarding the integrity of this interaction is vital to protecting and sustaining the area and its associated nature conservation and other values
		VI	Protected area with sustainable use of natural resources: Areas which conserve ecosystems, together with associated cultural values and traditional natural resource management systems. Generally large, mainly in a natural condition, with a proportion under sustainable natural resource management and where low-level non-industrial natural resource use compatible with nature conservation is seen as one of the main aims
		unk	IUCN category unknown or not assigned
Reversal	Was the PADDD event later reversed?	y, n, unk	<ul style="list-style-type: none"> • <i>For enacted PADDD</i>: was the legal change later reversed? • <i>For proposed PADDD</i>: was the proposal later cancelled, withdrawn, or voted against? • Includes both partial and complete cancellations of PADDD events (see Rev_Type below). • In general, PADDDtracker considers reversals to PADDD events that have occurred at least two years after the original legal change. This rule assists in accounting, as a PADDD event may be enacted in December of year 1, with a follow-up legal change in January of year 2 which may simply refine the original ruling (e.g. an offset or correction) instead of reverse it. However, if legal and/or secondary documentation is sufficiently detailed to confirm reversals occurring <2 years after the original legal change, the information should be included. • If the reversal status is known, populate the field with “yes” or “no.” Otherwise, fill in “unk” if there is no evidence of a reversal in legal or secondary documents. Reversal status may require updating.
YR_Reversal	Year PADDD event was reversed, if applicable	1872-present	<ul style="list-style-type: none"> • <i>For enacted PADDD</i>: the year when the PADDD event was reversed. • <i>For proposed PADDD</i>: the year when the PADDD proposal was withdrawn or voted against. • Includes partial and complete reversals of a downgrade, downsize, or degazettement event • PADDDtracker begins collecting data in 1872 to correspond with the establishment of the first modern-era national park (Yellowstone).
Offset	Were restrictions or extent under protection increased to explicitly compensate for the PADDD event?	y, n, unk	<ul style="list-style-type: none"> • <i>For enacted PADDD</i>: were protections expanded to explicitly offset PADDD (spatial offset)? Were restrictions increased within an existing protected area to explicitly offset PADDD (regulatory offset)? • <i>For proposed PADDD</i>: is there a formal proposal under consideration to expand protections to explicitly offset PADDD (spatial offset)? Is there a formal proposal under consideration to increase restrictions within an existing protected area to explicitly offset PADDD (regulatory offset)?

			<ul style="list-style-type: none"> Note that the offset may not be the same size as the PADD event (i.e. may be smaller or larger)
Systemic	PADD events that affect multiple protected areas simultaneously	y, n, unk	<ul style="list-style-type: none"> <i>For enacted PADD</i>: was this instance of PADD a part of a legal change that affected multiple (more than one) protected areas at the same time? <i>For proposed PADD</i>: is this instance of proposed PADD part of a legal proposal that would affect multiple (more than one) protected areas at the same time if enacted? Systemic (i.e. system-wide) PADD events typically affect all protected areas within a certain category or type simultaneously, and usually emerge from a change to national or sub-national laws or regulations.
Date_Add	Date added to database		
Supporting	Detailed notes about the PADD event		<p>Wherever possible, use direct quotes from sources. Supporting details should include, but need not be limited to:</p> <ul style="list-style-type: none"> Direct quotes from legal and/or secondary documents describing the event and its context Detailed explanation of the cause(s) of the PADD event Notes on reversals, offsets, or systemic changes associated with the PADD event <p>Report all available information. In cases of conflicting accounts of the same event, report all accounts.</p> <p>Example (that would be classified as a downgrade):</p> <ul style="list-style-type: none"> Rio Mequéns State Sustainable Yield Forest was degazetted in 2010, as part of an agreement between the Governor of Rondônia and the President which changed the size and status of multiple protected areas in the state of Rondônia, in order to develop the Jirau Hydroelectric Complex in the region (Bernard et al. 2014, Imazon 2010). During the degazettement, however, a portion (508 km²) of the reserve was incorporated into Parque Estadual Corumbiara. See following explanation from the current PE Corumbiara website: http://uc.socioambiental.org/en/uc/2210
Sources	All relevant sources that provide information about the PADD event		<p>This should include all sources used in the “Supporting Details”, as well as other relevant sources that may not have been directly used in the Supporting Details. All citations should be in MLA style. Examples:</p> <ul style="list-style-type: none"> Bernard, E., Penna, L., & Araújo, E. (2014). Downgrading, Downsizing, Degazettement, and Reclassification of Protected Areas in Brazil. <i>Conservation Biology</i>. https://conbio.onlinelibrary.wiley.com/doi/abs/10.1111/cobi.12298 Estado de Rodonia. 2010. Diario Oficial no. 1520. Jul 20. Retrieved from http://www.diof.ro.gov.br/doi/doi_30_06_10.pdf Instituto Socioambiental. 2010. O estica e encolhe das Unidades de Conservação de Rondônia. Jul 28. Retrieved from http://site-antigo.socioambiental.org/nsa/detalhe?id=3135 Instituto Socioambiental. 2010. Termina a novela da hidrelétrica de Jirau e a permuta de UCs em Rondônia. July 20. Retrieved from http://www.socioambiental.org/nsa/detalhe?id=3130 Globo Rural. 2011. Unidades de Conservação desaparecem em RO. April 11. Retrieved from http://g1.globo.com/economia/agronegocios/noticia/2011/04/unidades-de-conservacao-da-floresta-amazonica-desaparecem-em-ro.html

			<ul style="list-style-type: none"> Veríssimo, A., Rolla, A., Vedoveto, M., & Futada, S. de M. (2011). Áreas Protegidas na Amazônia Brasileira: avanços e desafios (p. 87). Belém/São Paulo: Imazon e ISA. Retrieved from http://www.imazon.org.br/publicacoes/livros/areas-protegidas-na-amazonia-brasileira-avancos-e/6-pressapso-sobre-as-areas-protegidas-na-amazania
Notes	Additional notes or sources that would benefit the entry		
AddedBy	Name of person who added the data		
Additional Attributes			
The following attributes are not currently part of Data Release 2.0, but will be part of future data releases			
Off_Type	Offset type	Spatial, Regulatory; Both; unknown; not applicable	<ul style="list-style-type: none"> A spatial offset is the expansion of the spatial extent of protection to explicitly compensate for PADDD. Lands may be added to the protected area that was downgraded or downsized, added to a separate protected area, or designated as a new protected area. A regulatory offset is the instatement of additional restrictions within an existing protected area to explicitly compensate for PADDD. These may be restrictions enacted within the protected area that was downgraded or downsized or within another protected area. Offsets may include both spatial and regulatory components. Note that the offset's compensatory area or restrictions may not match those of the PADDD event.
Off_Area	Offset area	Area values (km ²)	Spatial extent of lands added to protection (spatial offset) or for which restrictions are increased (regulatory offset). Note that the offset area may not be the same spatial extent as the PADDD event.
Off_Details	Detailed notes about the offset		Wherever possible, use direct quotes from sources. Supporting details should include but need not be limited to detailed explanation of the cause of the PADDD offset and any context that provides relevant insights. Report all available information; in cases of conflicting accounts of the same event, report all accounts.
Off_Source	Sources/supporting documentation that provide information about the offset		Include all sources used in Off_Details as well as other relevant sources that may not have been directly used in Off_Details. All citations should be in MLA Style. This may the same source provided in the Supporting Details field.
Rev_Type	Type of reversal	full, partial; unknown; not applicable	For a downsize or degazette, a full reversal occurs if the original area that was removed from the protected area is completely re-protected. For a downgrade, a full reversal occurs if the original restriction was completely reinstated. All other reversals are partial.
Rev_Area	Reversal area	Area values (km ²)	<ul style="list-style-type: none"> <i>For enacted PADDD</i>: The size of the parcel of land for which PADDD was reversed. <i>For proposed PADDD</i>: The size of the parcel of land in which a proposed PADDD event was cancelled, withdrawn, or voted against. Note that the reversal area may not be the same size as the PADDD event.

Rev_Details	Detailed notes about the PADDD reversal		Wherever possible, use direct quotes from sources. Supporting details should include but need not be limited to detailed explanations of the cause of the PADDD reversal and any context that provides relevant insights. Report all available information (in cases of conflicting accounts of the same event, report all accounts).
Rev_Source	Sources/supporting documentation that provide information about the reversal		Includes all sources used in Reversal Supporting Details as well as other relevant sources which may not have been directly used in the Reversal Supporting Details. All citations should be in MLA Style.
Map_Details	Supporting details for map of PADDD event		<p>Sufficient detail to understand how the map was created. Was it derived from an existing shapefile, created using coordinates, or digitized from a paper map? Was it estimated using a description in legislation? Was it placed on the capital city (e.g. in the case of an unknown location of a degazette)?</p> <p>If the map was digitized from a paper map, please report on the quality of the map and the accuracy of the digitization.</p> <ul style="list-style-type: none"> • What reference points did the map include (e.g. coordinates, political boundaries, coastline, rivers, roads, cities, etc)? • Was the map hand-drawn or computer generated? Provide other supporting descriptions about the map's quality. • What was the scale of the map? • If available, what was the projection of the map? • What was the Root Mean Squared Error (RMSE) reported and the projecting method during the georeferencing process? (Note that the ideal RMSE value is zero and values should not exceed 1.) • When tracing the map, how many vertices did tracing require?
Map_Source	Map source information		All sources used in the "Map Supporting Details" as well as other relevant sources which may not have been directly used in the Map Supporting Details. All citations should be in MLA Style.
Legal_Type	The legal process by which the PADDD event happened. For instance, was it enacted or proposed as legislation, an agency regulation, or presidential decree?		<p>Legal types will vary by country, but may include:</p> <ul style="list-style-type: none"> - Legislation - Provisional measure - Bill - Supreme or Ministerial Decree - Presidential proclamation - Judicial decision
Marine	Code noting whether the PADDD event was terrestrial, coastal, or marine	<p>0 = terrestrial</p> <p>1 = coastal (both marine and terrestrial)</p> <p>2 = marine</p>	Using the World Vector Shoreline, 3 rd Edition (Wessel and Smith 1996) base map layer: if 10% or less of the area of a PADDD event overlaps with the marine portion of the base layer, the PADDD event should be assigned a value of '0' for 'terrestrial'. If the overlap is greater than 10% and less than 90%, the PADDD event should be assigned a value of '1' for 'coastal'. If the overlap is 90% or more, the PADDD event should be assigned a value of '2' for 'marine'. Follows approach taken by Protected Planet (<i>UNEP-WCMC</i> , 2019).

PADDD Research “Cheat Sheet”

A quick guide for getting started on PADDD research

Define the temporal (the when) and geographic (the where) scopes of the study.

Successful archival research efforts on PADDD typically focus on one country (or sub-national unit) at a time.

Define the baseline: what is included as a protected area in the study region and time period?

What are the state (government)-designated protected areas in the country? Consult the national and sub-national level protected area database(s) and omit international designations (Ramsar sites, UNESCO World Heritage and Man-and-Biosphere sites). State-designated protected areas may include national and sub-national categories. Note that the list of state designated protected areas may not match the list of recognized (reported to the WDPA) sites. Apply the protected area definition (Dudley 2008), and document any discrepancies between lists, providing sources as justification.

- What about previously designated protected areas? There may be protected areas that were degazetted and do not appear in current lists or databases. Review historical/archival documentation to verify this. This may include sites like Forest Reserves, Game Reserves, or other sites that were established by regimes that no longer exist.
- Review the original legislation that established protected areas to understand the legal framework (e.g. protected area categories/types, prohibited and authorized activities, processes for changing protected area boundaries or restrictions, etc.). Note that this legal framework may have changed over time, which may have introduced PADDD events.

Next, determine where to find legal documents.

- The official gazetteers (primary publications) of legal documents for each country are listed here: <http://www-personal.umich.edu/~graceyor/doctemp/gazettes/index.htm>
- You can learn more about the digital resources for legal documents through Yale Law School: <http://library.law.yale.edu/all-countries>
- And through the U.S. Library of Congress (for instance): <http://loc.gov/lawweb/servlet/GlinArchive?Peru>
- Note that legal documents may or may not be online, especially older documents, and in certain countries. Information about proposed PADDD events may also be more difficult to find. National archives, libraries, and other similar repositories may be the only source of certain legal documents.
- Document the sources you found, used (and did not use), and how you used each.

Then, review legal documents that refer to protected areas and natural resource laws, some of which may provide information about PADDD events.

Use (and keep track of) relevant search terms, tailored to the country’s legal terms and language, to ensure that you obtain all relevant documents to indicate candidate PADDD events (leads). For instance, in the US, you may use govtrack.us (a database of US legal documents, including proposed bills) search key terms (e.g. “national park” “national monument” “national wildlife refuge”).

To assist in the search, look for “leads” (or clues, candidate events) to identify additional PADDD events.

- Through scholarly publications, search Google Scholar, Web of Science, online and physical libraries, and other repositories.
- Through the media: track PADDD events that are reported in online and print news, radio, etc.
- Earlier versions of government-provided shapefiles of protected areas: leads for downsizes and degazettes may be detected by comparing historical and current versions of shapefiles of protected areas. These should be considered leads only and must be confirmed using the legal documents and decision trees.

Use the PADDD decision trees (Fig. 3-6) and supporting documentation to confirm (or reject) leads and categorize each PADDD event as a downgrade, downsize, or degazettement.

Use best available sources, following the Acceptable Sources and tier system above. Keep track of rejected events in a separate table.

Fill out the PADDD attribute table.

Using primary (legal documents) and secondary sources, populate the attribute information (see Table 1). Provide as much detail as needed in the “supporting details” field to justify inclusion of the event; full quotes from legal and secondary documents are preferred. The minimum attributes needed to include an event in the database are: protected area name, event type (downgrade, downsize, or degazette), event status (enacted or proposed), and at least one quantitative indicator (year PADDD, area affected).

What about maps?

Maps of PADDD events and protected areas may be digital (i.e. shapefiles) or may only exist on paper. Maps may also only be represented in legislation as coordinates or descriptions of boundaries. Maps may come from a variety of sources, including government websites (e.g. the protected area agency, Ministry of the Environment), legal documents, scholarly books and papers, park managers, or other experts. Use the best-available spatial information (shapefiles, coordinates, high quality paper maps) to create digital boundaries of PADDD events in GIS, aiming to capture polygons for each event. For downsizes, include only the portion of the protected area that was removed from protection. If polygons or spatial representations of PADDD events are not available, represent the events as points.

The research process to identify, confirm, and populate attributes for PADDD events is iterative and may include triangulation of multiple sources to confirm details.

The more high-quality and primary sources supporting and confirming each PADDD event and its details, the better. Resolve discrepancies in sources following the “Inconsistencies in Data Sources” section, above.

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Selected additional PADD research

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See [Annotated Bibliography](#) for additional literature on PADD.