Alianza MéxicoREDD+
Con la gente por sus bosques

FINAL REPORT

ANALYSIS OF CORRECTIVE ACTION REQUESTS ISSUED TO FSC-CERTIFIED FORESTS IN MEXICO

Allen Blackman
blackman@rff.org

Alicia Raimondi
alr4317@gmail.com

Frederick Cubbage
fredcubbage@yahoo.com

November 25, 2013

USAID DEL PUEBLO DE LOS ESTADOS UNIDOS DE AMÉRICA

The Nature Conservancy
Conservando la naturaleza.
Protegiendo la vida.

Rainforest Alliance
Alianza para Bosques

THE WOODS HOLE RESEARCH CENTER

espacios naturales
y desarrollo sustentable

www.alianza-mredd.org

1. BACKGROUND

Initiatives certifying that producers adhere to defined environmental standards are increasingly popular worldwide. In theory, they stem environmental degradation by enabling consumers, capital markets, and communities to more easily identify and reward clean producers and punish dirty ones by, for example, buying or not buying their products. Advocates claim that eco-certification holds special promise for developing countries because it creates a non-regulatory system of incentives, monitoring and enforcement, thereby sidestepping weak institutions, limited political will and other chronic barriers to conventional command-and-control approaches. But to know whether to devote scarce financial, human, and political resources to promoting eco-certification in developing countries, particularly as a means to support implementation of emerging REDD+ programs, policymakers need to understand whether and under what conditions it actually stems deforestation and forest degradation. That, in turn, requires empirical evaluation.

Among the initiatives for which such evaluation is needed, Forest Stewardship Council (FSC) certification is arguably the most important for three reasons. First, the environmental problem it addresses is severe and resists conventional regulatory remedies. According to the United Nations Food and Agriculture Organization, the overall rate of deforestation in developing countries remains "alarmingly high" (FAO 2011). This is particularly true in Latin America, where deforestation averaged 0.5 percent per year between 2000-2010, five times the global rate (FAO 2011). This deforestation together with forest degradation have bred a host of environmental problems including soil erosion, aquifer depletion, and diminished biodiversity. Command-and-control regulatory tools like protected areas and logging permits, often have little effect (Blackman et al. In Press; Miteva et al 2012). For example, the average natural protected area in Mexico had no discernible impact on forest cover change during the 1990s (Blackman et al. 2011).

Second, FSC certification has been widely adopted and heavily promoted. Established in 1993 with the aim of stemming deforestation and improving forest management in tropical countries, FSC is the largest forest certification scheme in the world. It has certified 1,181forests covering more than 170 million hectares in 80 countries (FSC 2013). National governments and leading multinationals, including the Global Environment Facility and World Bank, have devoted considerable resources to promoting it, and are increasingly interested in using it to reduce greenhouse gas emissions from deforestation and forest degradation, and to conserve forests and

enhance forest carbon stocks, that is, for REDD+ (Brotto et al. 2010; FSC Forest Carbon Working Group 2011).

Finally, despite the potentially important role it could play in stemming forest cover change, and despite its high profile in the policy community, we still know relatively little about whether, under what conditions, and how FSC certification affects forest management and environmental outcomes (Miteva et al 2012; Blackman and Rivera 2011; Romero et al. 2013).

Mexico is a critical test bed for FSC certification. Historically, Mexico has had one of the highest deforestation rates in the world (FAO 2011) and it currently has 33 FSC-certified forests, the third highest number in the developing world (FSC 2013).

2. OBJECTIVE

The broad objective of this project is to shed light on the effect of FSC certification on forest management and environmental outcomes in Mexico. The project has three more specific objectives. The first is to compile and analyze corrective action requests (CARs) issued after inspections of certified forest management units (FMUs) in Mexico by either certifying bodies or auditors. CARs detail the changes in procedures and on-the-ground conditions that land managers must make to either obtain a new certification or retain an existing one. Therefore, they provide insight into how FSC certification affects forest management. The second specific objective is to develop a general method for conducting similar analyses in other countries. The last specific objective is to inform a complementary econometric analysis of the effect of FSC certification on cover change. This separate project is being undertaken by Resources for the Future (RFF) in collaboration with the National Ecology and Climate Change Institute (INECC) of the Mexican Environment Ministry. In Section 9.3, we return to the relationship between this analysis and the present one.

3. ORGANIZATION OF REPORT

This remainder of this report is organized as follows. Sections 3-7 explain the methods, procedures, and assumptions used to create an accompanying database categorizing CARs (FMCOC_CertifiedEjidos_V9.xlsx). The last section presents a brief analysis of these data.

4. SAMPLE OF FOREST STEWARDSHIP COUNCIL CERTIFIED FOREST MANAGEMENT UNITS AND OF CORRECTIVE ACTION REQUESTS

We use information compiled by David Hughell of Rainforest Alliance (RaFmCert_25Oct12.xlsx) to identify FSC certified FMUs in Mexico. These data include 35 FMUs in Mexico that have at some point had FSC forest management (FM) certification. The FMUs include ejidos and comunidades—common property institutions that control the majority of forests in the country—and private holdings. It is not clear that these 35 FMUs are the only ones to have been certified in Mexico. Anecdotally, a handful of other FMUs have been certified a period of time. However, to our knowledge, written documentation for these certifications is not available.

As per a May 15, 2013 email with Will Crosse, we're only focusing on CARs issued to FMUs with FM certificates or joint FM/chain of custody certificates (FM/COC). We are not interested in FMUs that only have COC certificates. Furthermore, for the FM/COC FMUs, we're focusing only on FM issues. Therefore, when a CAR lists violations of COC criteria, we record this fact [**variable = coc**], but do not elaborate on which COC criteria were violated.

5. DOCUMENTS CONTAINING CORRECTIVE ACTION REQUESTS

CARs are included in three types of documents: annual audits, certification/recertification reports, and verification (follow up) reports. We focused on all documents covering audits that occurred through December 31, 2012. We obtained documents from two sources: the FSC website (http://info.fsc.org/) and Alison Lesure at Rainforest Alliance, who has direct access to files of FSC documents. Altogether we obtained 233 documents (see FMCOC_CertifiedEjidos_V9.xlsx, specifically, the sheet titled "List of Docs"). These included

- 132 annual audits;

- 59 certification/recertification reports; and

- 42 verification reports

These documents comprise virtually all of those that have been generated for FSC certified FMUs in Mexico. Having searched the FSC files, Alison Lesure at Rainforest Alliance determined that our analysis very likely missed fewer than 8 documents. In only one case did she know of a document that exists, but for which a copy could not be found. In seven other cases, we determined that a verification report *might* be missing because a document called for a follow-up verification audit, but a report on that audit could not be found. That could be because the report was filed but is now missing. But it also could be because the verification audit never occurred or the report was never filed.

6. ISSUE CATEGORIES

6.1. Rationale for categorization system

At the heart of our analysis is a system for categorizing CARs based on which FSC criteria the FMU in question has violated [**variable = cat**]. To categorize CARs, we could use as a template either: (i) the actual FSC SmartWood criteria for Mexico—for example, if a CAR says that a FMU needs to remedy non-compliance with a Mexican standard on indigenous people's rights, we could simply place that CAR in a category corresponding to that standard—or (ii) a more general set of criteria.

We choose a combination of these approaches. We used a slightly modified version of the general categories detailed by Newsom and Hewett (2005)—hereafter "issue categories." However, we also recorded the actual FSC Forest Management Certification Standards for Mexico (V5-1) for each CAR [**variables = mx_criteria1, mx_criteria2, etc.**], as well as the International FSC standard (Version 4) [**variables = fsc_criteria1, fsc_criteria2, etc.**]. There are several reasons for this strategy:

- SmartWood criteria have changed over time, and have evolved from a set of interim standards to a set of FSC national standards. As a result, option (i) alone would be quite complicated;

- focusing on the issue categories allows us to compare our findings to those of Newsom et al. (2006) and Newsom and Hewett (2005) al. which analyze FSC CARs in 21 countries and in the US respectively;

- the four issue meta-categories that we use (environmental issues, social issues, economic/legal issues, forest management issues) roughly align with widely used three-part conceptual framework for measuring and monitoring sustainable forest management (environmental issues, social issues, economic issues); and

- recording the actual FSC SmartWood criteria for Mexico for each CAR is low cost since these criteria are included in the CARs.

We attach the FSC criteria for Mexico which are quite detailed. International FSC standards can be found at https://us.fsc.org/mission-and-vision.187.htm

We have made one change to the issue categories used in Newsom and Hewett (2005)—we have dropped the fifth metacategory, systems issues. One reason is that most CARs focus on an issue that has to do with both systems and with one of the other metacategories (environmental, social, economic, forest management). As a result, there is no clear decision rule for placing these CARs in the systems metacategory versus one of the other metacategories. In addition, a systems metacategory is not consistent with the conceptual framework found in most of the literature on sustainable forest management.

6.2. The categories

The following four metacategories (A-C) and issue categories (1-21) are those in Newsom and Hewett (2005) with the one modification described above (we have eliminated systems metacategory).

A. Environmental Issues

1. Aquatic and riparian areas
2. Sensitive sites and high conservation value (HCV) forests
3. Threatened and endangered species
4. Landscape-level considerations
5. Woody debris, snags, legacy trees
6. Soil and erosion

B. Social issues

7. Communication and conflict resolution with stakeholders, neighbors, and communities

8. Training

9. Worker safety

10. Non-timber forest products

11. Worker wages and living conditions

12. Special cultural sites

C. Economic/legal issues

13. Profitability of operation

14. Compliance with state, federal, and international laws

15. Illegal activities and trespassing

16. Long term tenure

D. Forest management issues

17. Roads and skid trails

18. Regeneration and reforestation

19. Chemical use and inorganic waste management

20. Exotic species and pests

21. Conversion to non-forest uses

In addition, we have added a twenty-second category to identify those CARs that concern COC standards

22. Concerns chain-of-custody (COC) standards

When CARs could be placed in multiple issue categories, we have kept a detailed record of the choices we've made and have been consistent in making the same choice for other nonconformities.

6.3. Examples

Appendix 1 provides examples of how we classified specific CARs, that is, into which of the issue categories listed above we placed each CAR.

7. ADDITIONAL INFORMATION IN DATABASE

7.1. Preconditions versus conditions

CARs can be either preconditions or conditions [**variables = condition, precondition**]. Preconditions flag non-compliance with standards that needs to be corrected in order for a FMU to be certified for the first time or recertified after a previous certification has expired. Conditions flag non-compliance with standards that needs to be corrected in order to maintain an existing certification.

7.2. Minor versus major

Starting in 2006, CARs were classified as either minor or major [**variables = minor, major**]. Minor CARs are issued in cases of "temporary noncompliance that is unusual or nonsystematic and that has limited effects." Major CARs are issued in cases where "there is a fundamental failure to achieve objectives of FSC criteria." Because the data do not distinguish between major and minor CARs prior to 2006, to be conservative, we classify all pre-2006 CARs as minor. In some cases, CARs originally were classified as minor, and in subsequent documents as major, often because of a failure to resolve the CAR by a specified deadline. We refer to such CARs as having been "upgraded." [**variable = upgraded**]

7.3. Direct versus indirect CARs

Following Newsom and Hewett (2005), Newsom et al. (2006) and McGinley et al. (2012) among others, we distinguish between (i) direct CARs, which require on-the-ground changes (related to either forests or communities) that actually generate the desired results and (ii) indirect CARs, which only require changes in procedures that may or may not have such impacts [**variables = direct, indirect**]. This distinction is included in written CARs although the terminology is different ("substantive" changes versus "procedural" changes; see Appendix 1).

7.4. Compliance

One limitation of the Newsom et al. articles is that they do not report whether CARs were ultimately resolved—that is, whether FMUs corrected the nonconformities cited in the CARs—and

if so, how long it took. Rather they drop from their study sample all FMUs that had their certifications revoked, and then assume that for the remaining units, any CARs issued must have been resolved since failure to do so would have resulted in revocation. But our data indicate that FSC either temporarily or permanently revoked the certification of 11 of the 35 FMUs in Mexico that were at one point certified and that we include in our study sample. Therefore, it is important to determine from FSC documents whether CARs were actually resolved. It is also useful to catalogue the amount of time FMUs were given to correct CARs, and how long it actually took them to do that. Therefore, we include all this information in the database.

7.4.1. Time allotted to comply

The amount of time that FMUs were allotted to comply with a CAR ranged from three months to five years [**variable = time_a**]. In some cases the total time allotted is the sum of the original time allotted and an extension [**variables = time_a_ext1, time_a_ext2**]. Extensions were particularly common before 2006. During this period, as noted above, CARs were not classified as minor and major, and were not upgraded from minor to major in the event that they were not resolved by the deadline specified in the original CAR. Instead, the CAR's unique identification number—report nonconformity (RNC) number—was often changed when the extension was granted. That is, a new CAR was created. In such cases, we do not treat these "new" CARs separately from the original CAR. We treat them as a single CAR that has the original RNC number. We calculate the total time allotted for compliance as the sum of the original time plus the extension.

Note that in these cases, this calculated total allotted time may be lower than the total time actually allotted for compliance due to lags between audits and the reporting of those audits in official documents. For example, say an FMU is given three months to resolve a CAR. After three months, a verification audit determines the CAR has not been resolved and a three-month extension is granted. However, the report on this verification audit and extension is not filed for two additional months. Therefore, we would report the total time allotted for compliance as (3+3=) six months but the actual time allowed for compliance is (3+3+2=) eight months.

7.4.2. On-time correction

We use an indicator variable to identify CARs that were met in the time originally allotted (i.e., before any extensions were granted) [**variable = car_met**].

7.4.3. Time for actual compliance

The total time to comply is defined as the difference between (i) the date of the audit during which the non-compliance was first observed, and (ii) the date of the audit during which the non-compliance was observed to be corrected [**variable = time_c**]. Given this definition, the total time to comply depends on lags between the situation on the ground and auditor observations. For example, say a non-compliance first occurred in January 2000, was detected in a February 2000 audit, was corrected the next month in March 2000, but was only observed to be corrected in a verification audit in August 2000. In this case, the actual total time to compliance would be two months (January-March) but we would record the total time as five months (March-August).

Note that prior to 2006, FMUs were sometimes allotted multiple years to correct CARs in stages. For examples, FMUs without management plans might be given one year to develop a plan and two additional years to implement it. This practice tended to generate relatively long time-to-compliance prior to 2006.

7.4.4. Open versus closed CARs

Reports characterize CARs as either open or closed. We record this distinction in the database [**variable = time_c**]. A CAR is considered open unless a document indicates that it was closed. However, if a CAR is relatively new (e.g., 2012), and the date set for follow-up audit came after December 31, 2012, we coded the open/closed status as missing.

7.5. REDD+ readiness

For each CAR, we indicate whether there was a correspondence to the safeguards developed for an international system for REDD+, namely: (i) the United Nations Framework Convention on Climate Change (UNFCCC) safeguards promulgated at the 16th conference of the parties (COP-16) in Cancun, Mexico, which are aimed at ensuring that REDD+ promotes good governance, respects rights of local and indigenous peoples, and conserves natural forests and biological diversity within countries where emissions reductions occur [**variables = unfcc1, unfcc2, etc.**]; and (ii) a set of three general REDD+ objectives [**variables = redd1, redd2, redd3**].

To efficiently and consistently determine whether each CAR we reviewed corresponded to these safeguards and objectives, we focused on the keywords in bold in the lists of safeguards and objectives included in Appendix 2. That is, if these key words or some variant were included in

the CAR, we coded the CAR as corresponding to the safeguard or objective. In cases where CARs corresponded to multiple safeguards/objectives, we selected the one safeguard/objective that in our judgment was the best fit. Appendix 2 includes examples of how we mapped CARs to UNFCC Safeguards and REDD+ Objectives.

8. VARIABLE DEFINITIONS

Note that where practical, we opted for indicator (0/1) variables instead of categorical variables to make data entry and quality control easier.

Table 1. Variable definitions

Variable	Definition
FMU-level variables compiled by David Hughell of Rainforest Alliance (RaFmCert_25Oct12.xlsx)	
cert_verification_reg_code	Certification unique identification number
date_originally_issued	Date certification originally issued
organization	Name of organization to which certification issued
cert_verification_type	Contiguity: 1= single continuous geographic unit, 0 = multiple units
no_sites_grp_members	When multiple units, total number
tot_cert_area	Total certified area (ha)
cert_latitude	Latitude of centroid of certified area
cert_longitude	Longitude of centroid of certified area
cert_location_accuracy	[meaning not known]
CAR-level variables compiled by RFF-NC State	
year	Year of report
rnc_no	CAR unique number
new_rnc	New CAR unique number #1 (used for accounting purposes)
new_rnc2	New CAR unique number #2 (used for accounting purposes)
cat	Modified Newsom et al. (2005) category (see explanation in "Cat. Code" sheet)
precondition	Precondition (versus condition) (0/1)
condition	Condition (versus precondition) (0/1)
minor	Minor (versus major) condition/precondition (0/1)
major	Major (versus minor) condition/precondition (0/1)
upgraded	Was CAR upgraded from condition to precondition? (0/1)
direct	Requires n-the-ground changes likely to generate desired results (0/1)
indirect	Requires changes in procedures that may or may not have on-the-ground impacts (0/1)
time_a	Time allowed to comply (in years, i.e. 0.25 = 3 months)
time_a_ext1	If CAR was not met, additional time allotted (in years, i.e. 0.25 = 3 months)
time_a_ext2	If CAR was not met, additional time allotted (in years, i.e. 0.25 = 3 months)

car_met	Was CAR met in allotted time? (0/1)
time_c	Total time it took to comply (in years, i.e.. 0.25 = 3 months)
closed	Was CAR closed? (0/1)
unfcc1	UNFCCC Cancun Safeguard #1 (see explanation in "Cat. Code" sheet) (0/1)
unfcc2	UNFCCC Cancun Safeguard #2 (see explanation in "Cat. Code" sheet) (0/1)
unfcc3	UNFCCC Cancun Safeguard #3 (see explanation in "Cat. Code" sheet) (0/1)
unfcc4	UNFCCC Cancun Safeguard #4 (see explanation in "Cat. Code" sheet) (0/1)
unfcc5	UNFCCC Cancun Safeguard #5 (see explanation in "Cat. Code" sheet) (0/1)
unfcc6	UNFCCC Cancun Safeguard #6 (see explanation in "Cat. Code" sheet) (0/1)
redd1	REDD+ Objective #1 (see explanation in "Cat. Code" sheet) (0/1)
redd2	REDD+ Objective #2 (see explanation in "Cat. Code" sheet) (0/1)
redd3	REDD+ Objective #3 (see explanation in "Cat. Code" sheet) (0/1)
mx_criteria1	Mexican SmartWood criteria #1 (0/1)
mx_criteria2	Mexican SmartWood criteria #2 (0/1)
mx_criteria3	Mexican SmartWood criteria #3 (0/1)
mx_criteria4	Mexican SmartWood criteria #4 (0/1)
mx_criteria5	Mexican SmartWood criteria #5 (0/1)
mx_criteria6	Mexican SmartWood criteria #6 (0/1)
mx_criteria7	Mexican SmartWood criteria #7 (0/1)
fsc_criteria1	FSC International standard #1 (0/1)
fsc_criteria2	FSC International standard #2 (0/1)
fsc_criteria3	FSC International standard #3 (0/1)
fsc_criteria4	FSC International standard #4 (0/1)
coc	CAR regards chain-of-custody criteria (0/1)

9. ANALYSIS

9.1. Forest management unit-level data

9.1.1. Timing of certifications

As noted above, we use data compiled by Rainforest Alliance on 35 Mexican FMUs that at some point have had FSC forest management certifications, and for which certification documentation is available. All of these certifications were first awarded after 1999, and just over a quarter were first awarded in 2012 (Table 2). Only three years saw more than four new certifications: 2002, 2004, and 2012.

Table 2. FSC certifications in Mexico, by year

Year	No.	Percent
2000	1	3

Year	No.	Percent
2001	2	6
2002	5	14
2003	2	6
2004	5	14
2005	2	6
2006	3	9
2008	3	9
2009	2	6
2011	1	3
2012	9	26
Total	35	100

9.1.2. Location and size of certified forests

Of the 35 Mexican FM certifications analyzed, eighteen were awarded to FMUs in Durango (Table 3). The state with the next highest number of certifications is Puebla, which has just three.

The mean size of certified FMUs is 19,000 hectares. Together they comprise 655,206 hectares. Not surprisingly, the state with the most certified hectares is Durango, which as just noted, has the most certified FMUs. Chihuahua, with just two certified FMUs, has the second largest area of certified forests, the result of one exceptionally large certified FMU (Ejido el Largo which comprises 251,867 hectares).

Table 3. FSC certification in Mexico, by state

State	No.	Percent	Ha.	Percent
Campeche	1	3	10,035	2
Chiapas	1	3	1,755	0
Chihuahua	2	6	267,531	41
Durango	18	51	307,785	47
Estado de México	1	3	464	0
Guerrero	1	3	8,114	1
Jalisco	2	6	1,608	0
Mexico D.F.	1	3	56	0
Michoacán	2	6	12,655	2
Oaxaca	2	6	31,648	5
Puebla	3	9	3,175	0
Veracruz	1	3	10,380	2
Total	35	100	655,206	100

9.2. Corrective action request-level data

9.2.2. Timing of CARs

In the 233 annual audits, certification/recertification reports, and verification reports that we reviewed, we found 1,162 CARs (Table 4). Between 1997 when the first CARs were issued (these were preconditions for certifications ultimately awarded in 2000) and 2013 when the last was issued, three years saw spikes in the number of CARs issued: 2002 when 159 were issued, 2004 when 130 were issued, and 2012 when 274 were issued. These are the same three years in which an unusually high number of certifications were awarded.

Table 4. Corrective action requests, by year

Year	No.	Percent
1997	2	0
2000	27	2
2001	47	4
2002	159	14
2003	41	4
2004	130	11
2005	61	5
2006	72	6
2007	62	5
2008	81	7
2009	96	8
2010	29	3
2011	66	6
2012	274	24
2013	15	1
Total	1,162	100

9.2.3. Issue categories

For the most part, CARs do *not* concern environmental or forest management issues. Metacategory B, social issues, accounts for the plurality CARs in our database—516 comprising 44 percent of the grand total of 1,162 (Table 5). Among these 516 CARs, 333, just under two-thirds, concern communications and conflict resolution (Category 7). The only other issue categories within Metacategory B that have a significant share of CARs are training (Category 8) and worker safety (Category 9).

Metacategory D, forest management, accounts for the second highest number of CARs—301 comprising 26 percent of the grand total. Among these 301 CARs, 60 percent concern regeneration and reforestation (Category 18) and 28 percent concern chemical use and inorganic waste management (Category 19).

Metacategory A, environmental issues, accounts for the third highest number of CARs—190 comprising 16 percent of the grand total. Among these 190 CARs, almost two-thirds concern sensitive sites and high conservation value (HCV) forests (Category 2) and just over a quarter concern either threatened and endangered species (Category 3) or landscape-level consideration (Category 4).

Metacategory C, economic/legal issues, accounts for the smallest number of CARs—155 comprising just 13 percent of the total. Among these 155 CARs, just over half concern the profitability of operation, and 44 percent concern compliance with state, federal and international laws.

Among all of the issue categories, the one with the greatest share of CARs is Category 7, communication and conflict resolution, within Metacategory B, social issues. Fully 29 percent of all CARs fall into this issue category. The issue category with the second highest share of CARs is Category 18, regeneration and reforestation, within Metacategory D, forest management issues, and the third is Category 2, sensitive sites and HCV forests, within Metacategory A, environmental issues.

Table 5. Corrective action requests, by issue metacategory and category

	Metacategory and category	No.	Percent all	Percent sub-cat.
	A. Environmental issues			
1	Aquatic and riparian areas	12	1	6
2	Sensitive sites and HCV forests	115	10	63
3	Threatened and endangered species	28	2	13
4	Landscape-level considerations	27	2	13
5	Woody debris, snags, legacy trees	1	0	0
6	Soil and erosion	7	1	6
	Subtotal	190	16	100
	B. Social issues			

7	Communication and conflict resolution	333	29	65
8	Training	77	7	15
9	Worker safety	74	6	14
10	Non-timber forest products	2	0	0
11	Worker wages and living conditions	28	2	5
12	Special cultural sites	2	0	0
	Subtotal	516	44	100
	C. Economic/legal issues			
13	Profitability of operation	79	7	51
14	Compliance with state, federal and int. laws	68	6	44
15	Illegal activities and trespassing	4	0	3
16	Long term tenure	4	0	3
	Subtotal	155	13	100
	D. Forest management issues			
17	Roads and skid trails	22	2	7
18	Regeneration and reforestation	181	16	60
19	Chemical use and inorganic waste management	84	7	28
20	Exotic species and pests	9	1	3
21	Conversion to non-forest uses	5	0	2
	Subtotal	301	26	100
	Grand total	1,162	100	

9.2.4. Conditions versus preconditions, major versus minor, and direct versus indirect

Of the 1,162 CARs in the database, virtually all—1,003, comprising 86 percent—are simple minor conditions (versus preconditions) that are indirect, that is, CARs that only require changes in procedures not on-the-ground conditions. Only seven percent of all CARs are preconditions, and this percentage does not vary much across metacategories (Table 6). Similarly, only seven percent of CARs are major, and again this percentage does not vary much across metacategories. Finally, only seven percent of CARs are direct. By contrast to the previous two statistics, this percentage does vary across metacategories. It is higher than average for the forest management issues, Metacategory D, and for environmental issues, Metacategory A.

Table 6. Percent corrective action requests that are pre-conditions, major, and direct, by issue metacategory (n = 1,162)

Metacategory	Pre-conditions	Major	Direct
A. Environmental issues	5	6	11
B. Social issues	8	8	0
C. Economic/legal issues	9	9	2
D. Forest management issues	6	7	19
All	7	7	7

9.2.5. Compliance with CARs

In general, the data suggest that FMUs take remedial actions to close CARs, and do it fairly expeditiously. We have information needed to determine whether 913 of our 1,162 CARs were closed (i.e., for these CARs, deadlines set for compliance predate the reports that we reviewed). Of these 913 CARs, fully 86 percent were closed (Table 7). This percentage does not vary much across most of the metacategories, but is somewhat lower in Metacategory A, environmental issues.

Table 7. Compliance with corrective action requests: original time allotted, number of extensions, total time allotted, total time to comply, percent closed on time, and percent closed, by issue metacategory.

Metacategory	Original time allotted [years] (n=1,162)	No. extensions (n=1,162)	Total time allotted [years] (n=1,162)	Total time to comply [years] (n=793)	Percent closed on time (n=876)	Percent closed (n=913)
A. Environmental issues	1.57	51	1.72	2.23	65	82
B. Social issues	1.13	99	1.22	1.68	70	88
C. Economic/legal issues	1.14	21	1.23	1.63	80	89
D. Forest management issues	1.31	63	1.45	1.97	73	87
All	1.25	234	1.36	1.85	71	87

We have information needed to determine whether 876 of these 913 CARs were closed on time, that is, by the deadline originally set for compliance. Of these 876 CARs, 71 percent were closed on time. This average is somewhat lower in Metacategory A, environmental issues. The average CAR in the entire set of 1,162 CARs had a compliance deadline of 1.25 years. However, 234 extensions were granted to FMUs. Therefore, the average total time allotted for compliance was

1.36 years. These average times are slightly higher in Metacategories A, environmental issues, and D, forest management issues. We have data to determine the total time to compliance for 793 of the CARs. For these 793 CARs, the average was 1.85 years. Again, this average was slightly higher in Metacategory A and D.

9.2.5. UNFCCC REDD+ safeguards

Two-hundred-and-forty-six of our 1,162 CARs—just over 21 percent—were directly relevant to one of the six UNFCCC REDD+ safeguards (Table 8). Of these 246 CARs, half focused on Metacategory A, environmental issues, just over a fifth on Metacategory C, economic/legal issues, just under a fifth on Metacategory B, social issues, and a tenth on forest management issues.

Table 8. Number (column percent) of corrective action requests that concern UNFCCC REDD+ safeguards, by issue metacategory

Metacategory	1. International conventions	2. National forest governance	3. Indigenous peoples	4. Stakeholder participation	5. HVC forests	6. Reversal risk	*All*
A. Environmental issues	2 (4)	2 (7)	0 (0)	0 (0)	119 (86)	0 (0)	123 (50)
B. Social issues	3 (6)	9 (32)	8 (89)	17 (94)	8 (6)	0 (0)	45 (18)
C. Economic/legal issues	40 (83)	10 (36)	1 (11)	0 (0)	1 (1)	1 (20)	53 (22)
D. Forest management issues	3 (6)	7 (25)	0 (0)	1 (6)	10 (7)	4 (80)	25 (10)
All	48 (100)	28 (100)	9 (100)	18 (100)	138 (100)	5 (100)	246 (100)

9.2.6. REDD+ broad objectives

One-hundred-and-thirty-two of our 1,162 CARs—just over 10 percent—were directly relevant to one of the three REDD+ broad objectives (Table 9). Of these 132 CARs, more than two-thirds focused on Metacategory D, forest management issues, and about a seventh each on Metacategory A, environmental issues, and Metacategory B, social issues.

Table 9. Number (column percent) of corrective action requests that concern REDD+ broad objectives, by issue metacategory

Metacategory	1. Avoided deforestation	2. Reduced degradation	3. Sequestration	*All*
A. Environmental issues	2 (33)	15 (13)	2 (14)	19 (14)
B. Social issues	2 (33)	17 (15)	0 (0)	19 (14)
C. Economic/legal issues	0 (0)	2 (2)	0 (0)	2 (2)
D. Forest management issues	2 (33)	78 (70)	12 (86)	92 (70)
All	6 (100)	112 (100)	14 (100)	132 (100)

9.3. Discussion

As noted in Section 2, the broad goal of our analysis of CARs is to shed light on the effect of FSC certification on environmental outcomes in Mexico, in part by cataloguing changes in procedures and on-the-ground conditions that land managers have been required to make to either obtain a new certification or retain an existing one. However, in interpreting our results, it is important to be clear about the objectives and limitations of our analysis.

Ours is not a formal impact evaluation. It does not attempt to establish a causal relationship between FSC certification and environmental outcomes. That is the goal of the parallel study being undertaken by RFF and INECC that uses econometric techniques to isolate and quantify the effects of FSC certification on deforestation that are additional, that is, that would not have occurred absent certification. Rather, the present analysis is a less formal, albeit potentially important, complement to that econometric evaluation. The econometric analysis only aims at determining whether and by how much FSC certification affects deforestation, but will tell us little about how or why. The present study can help fill that gap by examining the types of activities FMUs have undertaken to obtain or maintain certification.

Towards that end, perhaps the most salient findings from our analysis are that relatively few CARs issued to Mexican FMUs required large changes in forest management and environmental

outcomes. Two statistics support this finding. First, the majority of CARs issued to Mexican FMUs, and therefore the majority of the changes that these FMUs have made in response to CARs, concern issues other than forest management and environmental outcomes. Fifty-seven percent of CARs issued to Mexican FMUs concern social issues (Metacategory B) or legal issues (Metacategory C). Second, the vast majority of all of the CARs concerning forest management and environmental outcomes required only small changes. More than 90 percent were conditions, not preconditions, and therefore did not require fundamental changes to a pre-certification baseline. More than 80 percent were indirect and therefore did not require changes in the actual on-the-ground state of affairs. And more than 90 percent were minor and therefore did not require correcting serious noncompliance.

The finding that relatively few CARs issued to Mexican FMUs required large changes in forest and environmental management does not necessarily reflect badly on FSC certification. There are at least three possible explanations. First, the initial group of Mexican FMUs to obtain FSC certification has likely been disproportionately comprised of "already-green" ones—that is, FMUs that, prior to certification, already were already doing a relatively good job of forest management and environmental protection. Such FMUs have relatively strong incentives to obtain certification since the costs are relatively low—they need not invest in major changes to meet FSC criteria.

Because of this self-selection, however, the additional effect of FSC certification on forest management and environmental outcomes, although not insignificant, is smaller than it otherwise would be. Simply put, FSC certification in Mexico probably focused more on better performing FMUs, so has not lifted relatively poorly performing FMUs out of the cellar. If borne out by our econometric analysis, this finding would not be particularly surprising—most rigorous evaluations find that voluntary environmental programs like eco-certification have modest additional effects because of disproportionate participation of already-green agents (Pizer and Morgenstern 2007; Koehler 2008). Indeed, prior evaluations have reached similar conclusions about FSC certification in particular (Thornber et al. 1999).

Second, the finding that the bulk of CARs in our analysis do not concern forest management and environmental outcomes may stem from the fact that Mexican FMUs have found that compliance with social and economic FSC criteria has been particularly challenging (perhaps because the most of these FMUs are common property institutions with complex social and regulatory structures). As a result, even though the number of CARs related to forest and environmental management is substantial (almost 500), the number of CARs that mainly focus on other issues

is even higher (more than 670). In other words, the number of CARs related to forest management and environmental outcomes may only be low in a relative sense, not an absolute one, because other issues are particularly pressing. These issues may be important for improved forest management and environmental outcomes in the long run, but not apt to have easily measured effects in the short run.

The third potential explanation is a caveat to our analysis: our preliminary finding that certification has a modest additional effect on forest management and environmental outcomes may be driven at least partly by a limitation of our method. It may be that in anticipation of FSC certification—that is, in expectation of the initial inspection by a certifying body—Mexican FMUs made significant improvements to forest management and environmental protection. But our CARs analysis only picks up changes that occur after the initial inspection by the certifying body. As a result, it does not reflect these anticipatory effects. Depending on the timing of the remote sensing data, our complementary analysis may be able to control for these anticipatory effects.

At the end of the day, we are not able to determine which of these three explanations for the modest fraction of CARs focused on forest management and environmental outcomes is paramount. We suspect that all three play at least some role. If the first explanation turns out to be significant, the implication is that that FSC certification in Mexico has not had a large additional effect on environmental outcomes, at least not in the 15 to 20-year time span used for our analysis (a longer study period might be required to detect the effects of social and legal changes). Our econometric analysis will test this hypothesis.

Finally, what are the implications of our findings for the use of FSC certification to further REDD+? There are at least two. First, the fact that only a small fraction of CARs were directly relevant to UNFCCC REDD+ safeguards may reflect certified FMUs tendency to comply with these safeguards. To the extent that is true, FSC certification should be compatible with, and may even further, REDD+. A competing explanation is that the FSC criteria have little in common with the REDD+ safeguards. However, a third-party analysis of this overlap indicates substantial commonality [1].

---

[1] Rey, D. L. Rivera, U. Ribet, S. Korwin Recommendation for the Implementation of Safeguards in México: Analysis of Legal Framework and relevant and applicable Initiatives, Mexico, 2013.

A second implication of our findings for REDD+ is that policy makers using FSC certification to promote REDD+ may want to take special care to target FMUs with less-than-stellar environmental performance that might not voluntarily participate in the program. Although rules and regulations for an international REDD+ mechanism have yet to crystallize, additionally is sure to be a pillar of any system that emerges: the REDD+ concept is based on the idea of rewarding developing country forest managers for reductions in deforestation and degradation above and beyond business-as-usual levels. Our CARs analysis provides some indirect, although certainly not conclusive evidence that the FMUs that have self-selected into FSC certification in Mexico are those that already were doing a good job or managing their forests and protecting the environment. If that is true generally, then the effectiveness of FSC certification in generating additional improvements required in a REDD+ system will depend on targeting FMUs that are less-than-stellar performers.

REFERENCES

Blackman, A., R. Epanchin-Niell, J. Siikamaki, and D. Velez-Lopez. In Press. *Biodiversity Conservation in Latin America and the Caribbean: Prioritizing Policies*. Resources for the Future Press: New York.

Blackman A., and J. Rivera. 2011. Producer-level benefits of sustainability certification." *Conservation Biology* 25(6): 1176-1185.

Blackman, A., J. Robalino, and A. Pfaff. 2011. Paper park performance: Natural protected areas in Mexico. Working Paper. Washington, DC: Resources for the Future.

Brotto, L., D. Pettenella, L. Secco, and M. 2010. Integrating FSC certification in REDD+ projects: A guideline for project developers. Department of Land, Environment, Agriculture and Forestry (LEAF). University of Padova.

Food and Agriculture Organization (FAO). 2011. State of the world's forests 2011. Rome: FAO.

Forest Stewardship Council (FSC). 2013. Global FSC certificates: Type and distribution. June.

Forest Stewardship Council (FSC). 2011. Recommendations and strategic framework for an FSC climate change engagement. Forest Carbon Working Group. Bonn, Germany: FSC International Center.

Koehler, D. 2008. The Effectiveness of Voluntary Environmental Programs: A Policy at a Crossroads? *Policy Studies Journal* 35(4): 689–22.

McGinley, K. R. Alvarado, F. Cubbage, D. Diaz, P. Donoso, L.A. Gonçalves Jacovine, F.L. de Silva, C. MacIntyre, and E. Monges Zalazar. 2012. Regulating the Sustainability of Forest Management in the Americas: Cross-Country Comparisons of Forest Legislation. *Forests* 3: 467-505.

Miteva, D., S. Pattanayak, and P. Ferraro. 2012. Evaluation of biodiversity policy instruments: What works and what doesn't? *Oxford Review of Economic Policy* 28 (1): 69–92.

Newsom, D., V. Bahn, and B. Cashore. 2006. Does forest certification matter? An analysis of operation-level changes required during the SmartWood certification process in the United States. *Forest Policy and Economics* 9:197-208.

Newsom, D. and D. Hewitt. 2005. The global impacts of SmartWood Certification. Rainforest Alliance. June 9.

Pizer, B. and R. Morgenstern. 2008. *Reality Check: The Nature and Performance of Voluntary Environmental Programs in the United States, Europe, and Japan*. Resources for the Future Press: Washington, DC.

Rey, D. L. Rivera, U. Ribet, S. Korwin Recommendation for the Implementation of Safeguards in México: Analysis of Legal Framework and relevant and applicable Initiatives, Mexico, 2013.

Romero, C., F. Putz, M. Guariguata, E. Sills, P. Cerutti, G. Lescuyer. 2013. An overview of current knowledge about the impacts of forest management certification: A proposed framework for its evaluation. Occasional Paper 91.Center for International Forestry Research. Bogor, Indonesia.

Thornber, K., D. Plouvier, and S. Bass. 1999. Certification: Barriers to benefits. A discussion of equity implications. Briefing paper. Forest Certification Advisory Group.

APPENDIX 1. EXAMPLES OF CLASSIFICATION BY ISSUE CATEGORY

Each CAR includes in parentheses a unique FMU and a unique report number. For example, (170-06/12-proc) refers to the sixth CAR issued in 2012 for the FMU ending with the last 3 digits 170, and requires a procedure or process to occur in order to close the CAR (proc = process; subst = substantive).

1. Aquatic & Riparian Areas

- Protection measures must be applied for maintenance and/or enhancement of resources and services—issues surrounding sodium hypochlorite in drinking water and downstream fish (170-06/12-proc)
- Next MP should protect riparian areas along intermittent and ephemeral streams, not only permanent channels (231-26-subst)

2. Areas of High Conservation Value

- Consult with stakeholders and literature to determine if there are areas of high conservation value and create process to protect (4311-04/07-proc)
- Implement a system of monitoring in AHCV (170-03/09-proc)
- Audit team identified new AHCV (170-15/12-subst)

3. Threatened & Endangered Species

- FMs should inventory regional flora and fauna present in vulnerable ejido lands. FMs should propose protection/ conservation programs for vulnerable species (228-07/07-proc), (231-29-proc), (231-04/09-proc)
- FMs should analyze treatments, identify/ protect species, and incorporate monitoring results in MP (231-08/09-proc)
- Prepare a conservation program for biological diversity in the ejido according to species listed in Mexican regulation (170-18/01-proc)

4. Landscape Level Considerations

- Develop guidelines for sustainable use and management related to forestry activities, including erosion control, waste management, tree protection, etc. (4311- 05/09- proc)
- Present a conservation management program—total area preserved must be >= 10% of total forest area of ejido (170-17/01-proc)
- Ejido must submit analysis of lands—locating temporary and permanent agricultural lands, type of vegetation, and design a land zoning scheme for permanent forestry, biodiversity conservation, reserve and agricultural use. (132- 12/02-proc)

5. Woody Debris, Snags, & Legacy Trees

- FMs should establish areas of protection in diverse zones for old growth tree (170-16/01-proc)
- Create MP guidelines to minimize environmental impacts, focusing on the distribution of tree residuals (1307-05/04-proc)

6. Soil & Erosion

- Create MP guidelines for soil protection, including directional felling, sink/ waste arrangement post-harvest (170-07/12- proc)

7. Communication & Conflict Resolution

- OMF will provide a summary of the MP to the public
- Provide evidence that monitoring data is being incorporated into MP and provide a summary to the public (170- 03/08- proc)
- Must consult stakeholders when defining AHCV (170-16/12-proc)
- There is no social impact monitoring & forest and environmental monitoring systems needs to be completed—OMF should design and implement a monitoring plan (4311-07/09- proc), (170-13/12-proc)
- Land right conflicts between indigenous community and private landowners—record process of conflict resolution (101- 01/11-proc)
- Include information from research studies into next MP (166-08/06-proc)
- Revise community statutes regarding NTFP collection, hunting, etc. (166-01/07-proc)
- FMs must regulate use and access of deciduous forest area (166-02/07-subst)

- Community must sign long-term commitments to FSC principles (132-02/11-proc)

8. Training

- Train employees on proper handling, application, and storage of chemicals. Keep records of pesticides (date, quantity, dose, etc.) (132-04/09-proc)
- Ejido authorities admitted lack of knowledge in harvesting techniques, equipment, etc. – update MP with this info. (231-32-proc)
- Train chainsaw and extraction crews on directional felling/ BMPs- establish monitoring system to evaluate techniques (245- 05/08-proc)
- Ejido contracts the extraction of tree species, but company doesn't know FSC P&C—ejido must ensure compliance of private firm (245-02/10-proc)

9. Worker Safety

- Equipment instructions, penalties for non-compliance needed (4311-03/09-proc)
- Must have sufficient first aid kit and trained workers (170-03/12-proc)
- Make safety equipment available to all employees and seek ways to ensure use (166-02/06-proc)
- Must provide safety equipment for workers applying pesticides; separate chemical warehouse from worker rest areas (132-02/09-subst)

10. Non-timber forest products

- Create community regulation for extraction of resin (166-04/06-proc)

11. Worker Wages & Living Conditions

- OMF will document and inform workers about payment mechanisms and salary increases based on productivity (4311- 02/09-proc)
- OMF should monitor socio-economic impacts of certification on workers and local residents (4311- 04/09- proc) then incorporating into POA (170-04/12- proc)
- Must provide Social Security to employees (132-03/11-proc); (166-03/12-proc)
- Ejido defaults on payments to employee's housing credit (132-04/11-proc)

12. Special Cultural Sites

13. Profitability of Operation

- OMF has profitable operations outside of certified area; must sign commitment that other productive areas will not conflict with profitability of certified area (4311- 01/09-proc)
- Profit per year does not reflect a positive economic feasibility for a long-term forestry operation (170- 04/12- proc)
- Conduct a comprehensive utilization of material from felled trees for market potential (101-03/11-proc)
- General meeting held to discuss forest economics but FMs do not have reports that focus on data derived from assessments or criteria for reinvestment of profits (132-07/11-proc)

14. Comply with Regulations

- OMF should make treaties and international agreements signed by Mexico available to employees (4311- 01/10- proc)
- Catch up on tax returns and check documentation for SHCP requirement resolutions (166- 01/06-proc)

15. Illegal Activities & Trespassing

- Discontinue use of forest product, comply with FSC, and submit a written commitment (4311-01/07- subst.)
- Armed groups in temporary settlements control road access to certain areas. Ejido must maintain physical possession of the certified area (132-01/09-proc)

16. Long-term Tenure

- FMs will define land ownership to inhabitants of Canal community (208-02/07-proc)

17. Roads and Skid Trails

- Implementation of management plan—make transit route for abandoned roads and secondary vegetation, roads clogged by fallen trees, maintenance of plantations along roads (4311-01/11- subst.)
- Cracks on forest roads found during field visit (166-08/12-subst)

18. Restoration & Regeneration

- Restore specified area after wildfire damage (170- 01/10- subst.)

- Create an annual operating plan, including silvicultural operations and other activities related to forest management (170-03/10-proc)

- Monitor stands for environmental impact of use and mitigation measures implemented—produce reports (170-12/12- proc)

- System for monitoring exists, yet not implemented or reported on (101-01/12- proc)

- Implement measures to reduce damage to residual trees in logging areas (132-03/09-proc)

19. Chemical Use & Inorganic Waste Disposal

- Must clean up inorganic garbage (4311- 01/12- subst.) and document a procedure for control and clean up (170- 09/12-proc)

- Keep inventory of chemical use incl. type, date, quantity (170- 02/10-proc)

- Discontinue use of FSC prohibited chemical substances (170-08/12- subst)

- Create written procedure for checking/cleaning of oil/other lubricants (101-07/11-proc)

- Implement written guidelines for waste management (166-01/08-subst)

20. Exotic Species & Pests

- MP has not been implemented consistently—there is an operation plan (POA) however inconsistent management practices like fuel abundant understory, toppling trees, and pests in saplings (170- 10/12- subst)

- Regulate grazing in forest areas to improve environmental sustainability (101-04/11-subst)

21. Conversion

- Forest managers should delimit, classify, and quantify areas for conversion to plantations/ agrisilviculture
    - Clean only areas of secondary growth and verify using technology (4311-03/07-subst)
    - Inventory of past agricultural activity (4311-02/07- proc)

APPENDIX 2. EXAMPLES OF CLASSIFICATION BY UNFCC SAFEGUARDS AND REDD+ OBJECTIVES

Examples of how CARs mapped to UNFCCC Safeguards:

1) Actions complement or are consistent with the objectives of national forest programs and relevant **international conventions** and agreements.
   - OMF should make treaties and international agreements signed by Mexico available to employees
   - Establish mechanisms to control hunting of CITES and/or nationally recognized species

2) Transparent and effective **national forest governance** structures, taking into account national legislation and sovereignty.
   - Establish an agreement between two ejidos in accordance with forestry regulation and register with the National Forest Registry
   - Establish a POW for permanent road improvement, following regulations
   - Train employees about chemical use in compliance with Mexican statutes
   - Change the MP to protect species under Mexican protection laws
   - Illegal logging occurred by outsiders, FMs reported incident to state government
   - Have MP approved by authorities

3) Respect for the knowledge and rights of **indigenous peoples** and members of local communities, by taking into account relevant international obligations, national circumstances and laws, and noting that the United Nations General Assembly has adopted the UN Declaration on the Rights of Indigenous People.
   - Land right conflicts between indigenous community and private landowners—record process of conflict resolution
   - Use the metric system for measurements, if different from traditional knowledge then correct with conversion factors
   - Regulate NTFP extraction and other traditional land uses

4) The full and effective ***participation of relevant stakeholders***, in particular indigenous peoples and local communities, in the actions referred to in paragraphs 70 and 72 of this decision.

   - Establish agreement on livestock use in forest- include stakeholders
   - All working groups, including small stakeholder groups should be involved in forest operations decisions

5) Actions are consistent with the ***conservation*** of ***natural forests*** and ***biological diversity***, ensuring that actions referred to in the paragraph 70 of this decision are not used for the conversion of national forests, but are instead used to incentivize the protection and conservation of natural forests and their ***ecosystem services***, and to enhance other social and environmental benefits. (***Keyword: HCV)***

   - Formalize a system of management and monitoring for conservation areas (incorporating biological importance)
   - FMs should categorize and define conservation areas with stakeholder consultation- include in land use map
   - Install signs on protected areas to prohibit pollution, hunting and removal of trees
   - Should use a mixture of native species to restore forest, not just pine- monitor previously reforested site to see if the composition is the same
   - NOT INCLUDED: provision of monitoring reports to public on AHCV

6) Actions to address the ***risks of reversals***.
   - Create carrying capacity for livestock
   - Quantify (in ha) the proportion of secondary vegetation that has not been previous plantations and agricultural areas

7) Actions to reduce displacement of ***emissions***. **(DROPPED)**

Examples of CARs mapped to REDD+ objectives:

1) Avoided deforestation
   - Inventory ejido forests for productive area and clearly define logging areas and harvest cycles
   - Company should implement an outreach program to educate owners, technicians, and general public on best forest management practices and conservation
   - Ejido must submit analysis of lands—locating temporary and permanent agricultural lands, type of vegetation, and design a land zoning scheme for permanent forestry, biodiversity conservation, reserve and agricultural use.

- Illegal logging occurred by outsiders, FMs reported incident to state government and clarified that ejido use is from downed trees

2) Reduced degradation

- Create an annual operating plan, including silvicultural operations and other activities related to forest management
- Establish mechanisms to regulate forest use for household purposes (i.e. house building materials)
- Develop annual plan of work (POA)
- Implement measures to reduce damage to residual trees in logging areas
- Must manage grazing of forested areas to maintain environmental sustainability
- Manage livestock
- Develop maps of annual logging areas, including info on treatments, undisturbed areas/ state forests, etc.
- FMs are not properly delimiting and quantifying areas to be cleaned for forest and agricultural activities which may be affecting secondary semi-evergreens
- Create a program for prevention, control, and restoration of eroded areas, including soils eroded by access roads
- Must protect representative samples of existing ecosystems in their natural state, monitor, and identify on maps
- Identify representative forest area samples (i.e. pine) and develop management plan for conservation

3) Sequestration

- Evaluate productive potential and management in the 'area of low stocks' to either promote recovery or incorporate into conservation areas.
- Should use a mixture of native species to restore forest, not just pine- monitor previously reforested site to see if the composition is the same
- Illegal logging occurred by outsiders, FMs reported incident to state government. Must reforest by natural regeneration.
- Must reforest stands affected by wildfire
- Evaluate regeneration stands and identify problem areas- revise and implement treatments to improve regeneration success
- Develop a plan of work to restore pines in a forested area that was harvested for pine
- Verify that the rate of pine growth is greater than the rate of extraction—is sustainable
- Conservation area has damage from forest fires and pests- no action taken to clean

Alianza
MéxicoREDD+
Con la gente por sus bosques

www.alianzamredd.org

f AlianzaMREDD

🐦 alianzaMREDD

▶ AlianzaMREDD

-