

Family Forest Stewardship: Do Owners Need a Financial Incentive?

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ABSTRACT

This study assessed family forest owner interest in formally committing to the types of land use and management practices that characterize good stewardship if compensated for doing so, using Minnesota's Sustainable Forest Incentives Act (SFIA) as a proxy measure of forest stewardship. The SFIA provides an annual payment in return for obtaining and using a forest management plan and adhering to Minnesota's timber harvesting and forest management guidelines, among other requirements. Results of a mail survey indicate the typical Minnesota family forest owner has relatively small acreage, owns the land for a long time, lives in a rural area, is an absentee owner, considers hunting the most important reason for forestland ownership, and is not an active forest manager but supplies timber to the marketplace. Analysis of the survey data using a logit model found landowner interest in enrolling in the SFIA program was significantly influenced by the SFIA payment amount, acres of forestland owned, intention to obtain a forest management plan, opposition to the program's covenant requirement, and familiarity with the program. The model also estimated considerable compensation is needed to secure substantial participation of family forest owners in the SFIA program—nearly \$24/ac per year to enroll one-half of the owners surveyed. Marketing efforts to increase the program visibility and extolling the virtues of a forest management plan should be part of a strategy to increase family forest owner participation in the SFIA program.

Keywords: stewardship, family forests, financial incentives, sustainable forestry, willingness to accept, certification, economics

Family forests represent 40% of all forestland in the United States (Butler and Leatherberry 2004). These lands provide a range of goods and services that society is interested in perpetuating—timber, wildlife habitat, recreational opportunities, and clean water to name a few. This interest is manifest through a variety of ap-

proaches used by government to influence the management, use, and protection of family forestlands. They include developing and delivering information and education programs to forest landowners on proper stand establishment, management, and harvesting techniques; offering technical assistance to landowners who want to apply certain land management practices; providing financial assistance in the form of grants and cost sharing for specific practices and income and property tax incentives; acquiring specific rights in real property (typically development) from willing forest landowners; regulating and zoning the extent and types of timber harvesting, forest management, and land-use practices allowed on forestland; and purchasing forestland for public purposes.

Research on the relative influence these approaches have on the behavior of family forest owners and the management of their forests is considerable. For example, for nearly 70 years researchers have examined how technical and financial assistance pro-

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grams impact forest investment, management, and use practices on family forestlands (see, e.g., Yoho and James 1958, Schallau 1962, and Greene et al. 2004). The primary focus of these investigations has been to determine whether such programs lead to additional investment in forest management, the production of specific goods and services (e.g., timber) from family forestlands, or the application of environmentally sensitive forest management and timber harvesting practices (Kilgore et al. 2007).

However, most studies ignore the goal these policy tools are designed to implicitly achieve, viz., to encourage private forestland stewardship. Although the specific characteristics and definitions vary, forest stewardship promotes an approach to forest management where a range of ecological, economic, and social benefits from and uses of the land are perpetuated. An important and explicit dimension of forest stewardship is the application of ecologically sound timber harvesting and forest management practices. When applied, such site-level practices can positively influence the ability of forestlands to sustain a range of important ecological benefits (Minnesota Forest Resources Council 2005).

State governments have adopted two general approaches to encourage the application of these practices, commonly referred to as best management practices (BMP) or guidelines, on private forestlands. Fifteen states control forest management on private forests through a comprehensive forest practice regulatory framework (Ellefson et al. 2007). The remaining states use a mix of education and incentive programs to encourage private forest landowners to be good stewards through the application of their state's BMPs or guidelines (Kilgore and Blinn 2004).

Although many forest landowners apply the types of forest management and timber harvesting practices that characterize forest stewardship, being a good steward and being willing to formally commit to forest stewardship practices are not one in the same. One way in which landowners can show their commitment to forest stewardship is by having their forestland certified. Forestland certification is a process whereby forest landowners voluntarily seek an independent assessment of their forest management and timber harvesting practices in relation to a set of predetermined standards established by the certifying organization to ensure forest resources are managed for en-

vironmental, economic, and social benefits (Kilgore et al. 2007).

Despite its appeal to owners of large forestland holdings (both public and private), forest certification has not made significant inroads among family forest owners. The majority of family forest owners are not familiar with forest certification. Those that are express minimal interest in participating. Research has found that in spite of the fact that family forest owners are interested in applying sustainable timber harvesting and forest management practices on their land, many landowners are reluctant to undertake the necessary actions for forest certification. This reluctance to certify is multifaceted and driven by a (1) lack of desire to be publicly recognized for being a good steward of the land, (2) lack of financial benefits relative to the cost of certification, (3) perception that being certified could limit one's flexibility in land management approaches, and (4) belief that certification will lead to greater government scrutiny of future forestland management and use options (Rickenbach 2002, Vlosky and Granskog 2003, Newsom et al. 2003, Kilgore et al. 2007). Moreover, few family forest owners are willing to pay to have their forestland certified (Kilgore et al. 2007).

Given that most family forest owners are not willing to pay to formalize their commitment to forest stewardship by certifying their forestland, we sought to answer the following questions: (1) Are family forest owners willing to make a commitment to forest stewardship through the application of ecologically sound timber harvesting and forest management practices if paid to do so? (2) If they are, what level of compensation would be required and what type of family forest owner would be most likely to participate?

To answer these questions, we chose to evaluate family forest owner's interest in enrolling in Minnesota's Sustainable Forest Incentives Act (SFIA) program. The SFIA's commitment to planning and the application of environmentally responsible harvesting and management practices make it an excellent proxy of an owner's interest in formally committing to forest stewardship. To be enrolled in the SFIA program, forest landowners must (1) own at least 20 ac of contiguous land that contains no building structures and is at least 50% forested, (2) acquire and follow a forest management plan [1], (3) apply Minnesota's voluntary forest management guidelines when harvesting timber or undertaking forest manage-

ment activities (e.g., a silvicultural prescription), (4) commit to the SFIA program for at least 4 years before giving notice to cancel enrollment, (5) stay in the SFIA program for 4 additional years once a notice to cancel enrollment has been given, and (6) record a covenant on any SFIA-enrolled property restricting building on or development of the land while enrolled.

SFIA participants receive an annual "incentive" payment from the state based on the number of acres enrolled. Each year, the Minnesota Department of Revenue determines (by formula) the incentive payment amount (Kilgore 2002). In 2006, the annual payment was \$5.24/ac for all enrolled lands regardless of the property's location or value (J. Rosalez, Minnesota Department of Revenue, pers. comm., Feb. 15, 2007). As a point of comparison, the 2006 statewide average net property tax on forestland in Minnesota was \$3.96/ac (J. Feiner, Minnesota Department of Revenue, pers. comm., Feb. 26, 2008). [2] In 2006, only 658 individuals had enrolled 118,000 of the state's 5.6 million ac of family forest acres in the SFIA program (J. Rosalez, Minnesota Department of Revenue, pers. comm., Dec. 12, 2006).

Methods and Data

Survey. We administered a mail-back questionnaire to obtain information from Minnesota family forest landowners about their interest in making a commitment to forest stewardship by enrolling in the SFIA program. The questionnaire requested information on reasons for forestland ownership, perspectives on the SFIA program (e.g., interest in enrolling at a specified annual payment rate and attitudes toward the current SFIA requirements), historical and future planned forest management and land-use activities, future ownership plans, and owner demographic information (e.g., landownership tenure, number of parcels and acres of forestland owned, location of residence in relation to forestland owned, and age).

We used the contingent valuation method to estimate a family forest owner's willingness to accept compensation in return for making several commitments associated with being good forest stewards. Specifically, the questionnaire asked respondents if they would be willing to enroll in the SFIA program at a specified per acre annual payment (response choices were "yes," "no," or "not sure"). Survey participants were offered one of four payment levels (\$5, \$10,

Table 1. Family forestland in the study area.

County	Family forest acreage (1,000 of acres)
St. Louis	679
Pine	311
Itasca	303
Crow Wing	232
Ottertail	196
Aitkin	229
Hubbard	196
Cass	194
Becker	185
Beltrami	184
Carlton	174
Clearwater	130
Koochiching	126
Kanabec	116
Morrison	116
Total	3,369

Source: Minnesota Forest Statistics. 1990, Revised. Miles et al. 1995.

\$20, or \$30). The levels were randomly assigned so that one-fourth of the participants was offered each payment amount.

Parcels that were predominantly forested, undeveloped, and at least 20 contiguous ac were included in the study. Assessors' offices in Minnesota's 15 counties with the largest acreage of family forestland were contacted to obtain information on all forestland that met the study criteria. Collectively, these counties contain 60% of the state's 5.6 million ac of family forest acres (see Table 1). Information requested included the name and mailing address of the legal owner and information about the parcel (e.g., acres and estimated market value).

From this information, a list of potential recipients of the survey questionnaire was developed and subsequently screened to ensure only forested parcels that were not enrolled in the SFIA program and owned by individuals (i.e., family forest owners) were selected. Following a pretest of the questionnaire with 160 family forest owners (and subsequent modifications to the questionnaire), a random sample of 1,024 family forest landowners was drawn using the criteria and screening process with the sample weighted by the amount of family forest acreage in each county relative to the total acreage of family forestland in the 15 counties.

The survey was administered between October and December 2006 following the method described by Dillman (2000). This entailed mailing the survey participants an initial contact letter; study questionnaire, SFIA fact sheet, and cover letter; reminder

postcard; second questionnaire and cover letter; and final reminder letter. Six hundred forty family forest owners returned completed surveys, yielding a usable response rate of 63%. An analysis of the survey respondents and nonrespondents found no significant differences in key landowner metrics (e.g., acres of forestland owned) between the two groups, suggesting the data obtained and described in this report can be interpreted as being representative of northern Minnesota's family forest landowners meeting the study selection criteria (e.g., own at least 20 contiguous acres and not currently participating in the SFIA program).

Family forest owner responses to the question about willingness to enroll in the SFIA program at different per acre annual payment amounts were analyzed using a binary logit model. The model was used to identify family forest owner, forest parcel, and SFIA program characteristics that influence landowner interest in participating in the SFIA program. It was also used to estimate the probability of enrollment in the SFIA program under alternative levels of per acre annual compensation. Statistical tests were conducted to determine whether landowner responses of "not sure" to the SFIA payment question could be reassigned as either a "yes" or "no" response. These tests indicated the not sure responses could not be treated as either a yes or no response. Consequently the not sure responses were dropped from the model.

Results

Profile of Family Forest Owners. The typical Minnesota family forest owner who responded to the survey:

- Owned just one parcel of forestland, averaging 45 ac. Approximately two-thirds of all parcels whose owners responded to the survey were between 40 and 80 ac in size.

- Owned the land for a considerable period of time. Nearly one-half of the responding forest landowners owned their land for at least 15 years.

- Lived in a rural area. Nearly three-fourths of the forest landowners lived in rural areas, while 12% lived in a suburb of a metropolitan area. Only 4% resided within an urban area.

- As an absentee owner. Only one of nine responding forest landowners lived on their forestland. Of those absentee owners, more than one-half lived within 100 mi of their forestland.

- Considered hunting as the most important reason for owning forestland. In contrast, growing timber for income was only viewed as the most important reason for forestland ownership by 3% of family forest owners.

- Was not an active forest manager. Less than 20% had a forest management plan for their property.

- Was supplying timber to the marketplace. Greater than 40% of the landowners had commercially harvested trees since owning the land. Compared with the percent of acres harvested on other ownership groups, family forest owners were contributing their share of wood to the marketplace (Minnesota Department of Natural Resources 2007).

- Had not participated in forest landowner assistance programs. Less than 10% had received government cost share, technical assistance, or attended a forest landowner education program.

- Did not plan to become an active forest manager. Only 15% planned to acquire a forest management plan, and just 5% expected to undertake specific forest management activities such as treeplanting.

- Did not plan to seek assistance from a professional forester. Less than one-quarter intended to contact a professional forester to help with implementing land management practices such as setting up a timber sale.

- Did not plan to develop the forestland. Only 12% planned to build a permanent or seasonal home on their forestland.

As described by the survey results, Minnesota's family forest owners are comparable with family forest owners nationally in several respects (e.g., most own small tracts of forestland, do not consider growing timber for income a primary ownership objective, and view recreation and amenity values as important reasons for forest ownership). When contrasted to national statistics, a greater portion of Minnesota's family forest owners have a forest management plan, have conducted a commercial timber harvest, and are absentee owners (Butler and Leatherberry 2004).

Who is Likely to Enroll in a Stewardship-Type Program? Based on a review of the literature and our previous research on family forest owners (e.g., Greene et al. 2005, Kilgore et al. 2007, Kilgore et al. in press, Snyder et al. 2007), we hypothesized the following factors would influence a landowner's decision to enroll in the SFIA program: compatibility of past land manage-

Table 2. Sustainable Forest Incentives Act (SFIA) program, landowner, and forestland characteristics tested in a logit model for their influence on family forest owner interest in participating in the SFIA program.

Variable	Coefficient	Wald	SE	Influence on participation likelihood
SFIA program characteristics				
SFIA compensation level offered (\$/ac per yr) ^a	0.0575	17.0569	0.0139	6% more likely with each \$1 increase in compensation
Opposed to the SFIA's deed restriction requirement ^a	-1.5134	29.3857	0.2792	78% less likely if opposed to the deed restriction requirement
Landowner characteristics				
Owner had heard of the SFIA program before receiving the survey ^a	0.6910	4.7083	0.3185	100% more likely if owner had heard of the SFIA program
Owner had owned the forestland for at least 15 yr	0.1880	0.4487	0.2806	
Owner has participated in a forest landowner program	0.1460	0.0915	0.4828	
Total acres of forestland owned by the landowner in Minnesota ^a	0.0007	2.8129	0.0004	0.1% more likely with each additional acre of forestland owned
Owner plans to keep the land to pass on as an inheritance	-0.1254	0.1530	0.3206	
Owner plans to obtain a forest management plan in the next 5 years ^a	1.5454	14.9170	0.4001	470% more likely if owner planned to acquire forest mgmt plan
Owner plans a commercial timber harvest within 5 yr	-0.2114	0.5060	0.2972	
Owner lives on the forestland	0.3026	0.4197	0.4670	
Forestland characteristics				
Size (ac) of the forestland parcel	0.0017	0.8692	0.0018	
Presence of a forest management plan	0.17164	0.2274	0.3599	
History of forest management	-0.1326	0.2034	0.2940	
History of commercial timber harvest	0.1789	0.3552	0.3002	
Estimated market value per acre of the land (\$/ac)	<0.0001	0.1748	0.0001	
Constant ^a	-1.5414	5.5644	0.6534	
Model chi-square	100.351 ^a			
McFadden's R ²	0.223			

^a Significant at $P \leq 0.10$.

ment practices with those that are consistent with stewardship, compatibility of future plans for the land with those that are consistent with stewardship, awareness of programs that encourage forest stewardship, perceived constraints of such a commitment on future land use and ownership options, and the cost of forestland ownership.

From these five broad categories, 15 potential explanatory variables from the survey data set were included as predictor variables in a logit model. These variables were grouped into three major categories: SFIA program characteristics, landowner characteristics, and forestland characteristics. Of these 15 variables, only 5 were found to significantly impact a family forest owner's decision to enroll in the SFIA program: SFIA payment amount (dollars per acre per year), total acres of forestland owned, intention to obtain a forest management plan, opposition to the recorded covenant requirement, and familiarity with the SFIA program. Landowners who planned to acquire a forest management plan were nearly five times more likely to enroll than those who did not. Those family forest owners who had heard of the SFIA program before participating in the survey were twice as likely to participate over those who had not heard of it. With

each \$1 increase in the SFIA payment, landowners were 6% more likely to enroll in the SFIA program, and this likelihood increased by 0.1% with each additional acre of forestland owned. However, a landowner was 78% less likely to enroll if opposed to the SFIA's deed restriction requirement (Table 2).

Several factors we thought would influence a landowner's interest in participating in the SFIA program turned out to be insignificant (Table 2). A landowner's history of forestry activity as evidenced by the existence of a forest management plan, having conducted a timber harvest, or participated in a landowner education or assistance program did not influence interest in the SFIA program. This finding was particularly surprising for those owners with a forest management plan, given the plan is a key prerequisite for SFIA enrollment. Absentee owners were no more likely to enroll in the SFIA program, which also was unexpected given such owners may be looking for ways to reduce ownership costs given their assumed less frequent use of the land than owners who live on their property. We also anticipated that the size of the parcel and per acre value (a rough proxy for the parcel's property tax liability) would predict enrollment interest, as higher values of

each increase the cost of ownership. However, neither variable was significant in the model.

Payment Required to Enroll. Table 3 summarizes survey responses to the question about a family forest owner's willingness to enroll in the SFIA program in return for a specified level of compensation. Interest in participating in the SFIA program was modest at an annual payment amount of \$5/ac per year (which approximates the SFIA payment made in 2006), with only 15% indicating they would enroll their land. The percent of affirmative responses at both \$10 and \$20/ac per year was almost identical (31 and 30%, respectively), while 39% expressed interest in enrolling when the payment amount offered was \$30/ac per year.

Individuals who indicated they were not sure if they would enroll in the SFIA program at the payment amount presented did so for a variety of reasons. The most common reason cited for not being able to decide whether to enroll in the SFIA program at the payment amount offered was a lack of adequate information about the program—26% stated this as their reason for being unsure. Uncertainty regarding the covenant required to be filed if enrolled and the time and cost of enrolling their forest-

Table 3. Landowner willingness to enroll in the Sustainable Forest Incentives Act (SFIA) program at various annual per acre payment levels among survey respondents.

Per acre annual SFIA payment level offered	Response	No. of responses	Percent of responses
\$5	Yes	24	15
	No	100	64
	Not sure	32	21
\$10	Yes	51	31
	No	66	41
	Not sure	45	28
\$20	Yes	46	30
	No	58	38
	Not sure	50	32
\$30	Yes	55	39
	No	50	35
	Not sure	37	26

land were also frequently cited as reasons for not being able to decide whether to enroll in the SFIA program.

Discussion

Pay or Be Paid? Considering the results from this research on SFIA enrollment interest and previous research on family forest owner perspectives on forest certification sheds light on several important points about a landowner's desire to formalize his/her commitment to forest stewardship. First, few landowners are willing to pay to be encumbered by this obligation. However, an individual's forest ownership objectives often align with society's interest in private forestland, viz., providing nontimber outputs such as enhanced habitat or improved water quality (Greene et al. 2005). This was certainly true among the landowners who participated in our study. Survey respondents commonly cited wildlife, recreation, and amenity values as being the chief reasons for forestland ownership—only 3% identified growing trees for income as their most important ownership objective.

For the majority of family forest owners we surveyed, financial compensation was required for them to make a formal commitment to forest stewardship as expressed by enrolling in the SFIA program. For some, the level of compensation needed was substantial. Based on the results of our logit model and the characteristics of the family forest owner population we sampled, nearly a \$24/ac per year payment would be required for one-half of the family forest owners to enroll in the SFIA program. In con-

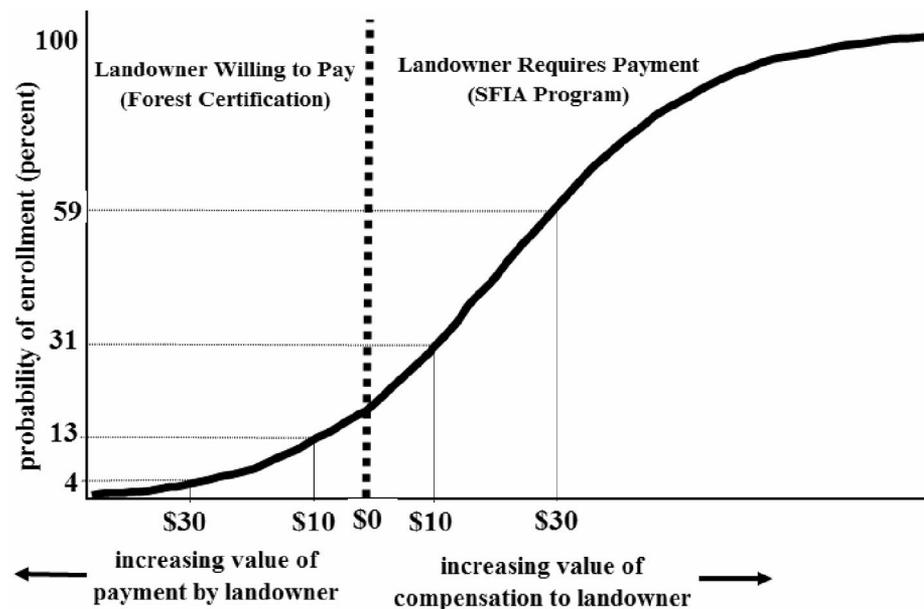


Figure 1. Estimated probability of family forest owner making a commitment to forest stewardship according to the amount of compensation received or payment made.

trast, the payment made to SFIA program participants in 2006 was considerably less at just over \$5/ac.

Using the logit model and survey data previously described (Table 2), the probability of enrolling in a stewardship-like program was estimated when the landowner is compensated as well as when the landowner is required to pay. [3] The portion of the curve in Figure 1 to the left of the vertical dashed line represents the cohort of family forest owners who are willing to incur a financial cost to show their commitment to forest stewardship, such as those landowners who are willing to pay to have their forestland certified. As expected, few are willing to do so, and the likelihood a landowner will make such a commitment decreases as the level of payment required of the landowner increases. The segment of the curve to the right of the dashed line represents those family forest owners who require compensation to formalize their commitment to forest stewardship, as expressed by their willingness to enroll in Minnesota's SFIA program. As the compensation for making a commitment to forest stewardship increases, so too does the landowner's interest in making this commitment.

Characterizing Landowners Who Will Pay. Few characteristics have been identified that describe the type of landowner willing to certify his/her forestland. Kilgore et al. (2007) reported that larger acreage landowners and those with forest

management plans were more active forest managers, participated more frequently in forestry assistance programs, were more likely to be members of a state forestry association, consulted with foresters more frequently, saw greater economic opportunities from certification, and were more familiar with forest certification. However, these forest landowners were no more interested in certifying their land relative to smaller acreage landowners or those without management plans.

Characterizing Landowners Who Need to Be Paid. Surprisingly, none of variables often cited in the literature as being indicators of the type of owner who is an active forest manager were found to be significant predictors of landowner interest in enrolling in the SFIA program. They include those owners who commercially harvested timber (e.g., Newsom et al. 2003, Measells and Grado 2005), acquired a forest management plan (e.g., Stevens et al. 2002, Rickenbach et al. 2005), or owned a large forest parcel (e.g., Zhang and Mehmood 2001, Kendra and Hull 2005). Several variables considered to be proxies for the costs of forestland ownership (e.g., parcel size and per acre parcel value) also did not impact a landowner's decision to participate.

Increasing Family Forest Acreage Formally Committed to Forest Stewardship. If the goal is to increase the acreage of family forestland formally obligated to the principles of forest stewardship, landowner

awareness of programs such as the SFIA that provide payment for a commitment to stewardship is important. Family forest owners who had heard of the SFIA program at the time they were surveyed were twice as likely to participate as those who had not heard of the program. This finding suggests that marketing efforts to raise awareness of such programs among the state's family forest owners may be an effective strategy to increase program participation. This supports the findings by Bell et al. (1994) that landowner knowledge of and attitudes toward incentive-based forestry stewardship programs may be more influential in increasing participation than the incentive amount.

Extolling the virtues of a forest management plan should be part of any stewardship outreach efforts directed at family forest owners. Even though landowners who already had a forest management plan were no more interested in participating in the SFIA program than those without one, the forest landowners in our study who planned to acquire a forest management plan in the near future (i.e., within 5 years) were nearly five times as likely to participate in the SFIA program as those owners with no such intention.

A considerable portion of the family forest owners we surveyed were uncertain whether to participate in the SFIA, suggesting the potential to increase the number of family forest owners willing to make a formal commitment to stewardship practices is considerable. As such, the manner in which programs such as the SFIA convey the concept of stewardship will likely have a major influence on their appeal to family forest landowners. Replicating the study in other parts of the United States would be an important consideration for future research to determine whether this study's findings characterize family forest owner attitudes and behavior beyond northern Minnesota.

Endnotes

[1] Although the cost of acquiring a forest management plan is borne by the landowner, financial assistance is available to help underwrite plan preparation costs. See Greene et al. (2005) for a detailed discussion of financial

assistance programs available to family forest owners.

- [2] Property taxes are levied against and paid on SFIA-enrolled forestlands in the same manner as nonenrolled lands.
- [3] Probability of participation was estimated by varying only the payment amount across a range of values, holding all other independent variables used in the model at their mean value.

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